

HANDICRAFTS
FOR THE
HANDICAPPED
HALL AND BUCK



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**HANDICRAFTS FOR
THE HANDICAPPED**

Handicrafts for the Handicapped

BY

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AND

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Authors of "The Work of Our Hands"

ILLUSTRATED WITH SKETCHES

BY THE AUTHORS AND

PHOTOGRAPHS

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INTRODUCTION.

In a former volume, "The Work of Our Hands," the authors have studied the advance which has been made along industrial lines in the hospitals and asylums of this country. The present volume is intended as a text book of a few crafts which have proved to be of special value to handicapped workers outside the institutions. The directions given are elaborate and detailed as far as possible so that the individual worker may be able to study out and practice a vocation for himself. The book will also be found of value to crafts workers who are dealing with handicapped labor in the various institutions; and in the private practice of physicians who realize that a patient at work is a patient half cured.

The subject of occupation for the handicapped has fortunately received an increasing amount of consideration in the past few years. The time is coming before long when the mere

fact that a man is partly disabled will not debar him from the advantages of labor. He may not be able to pursue his usual work, but a competent system for the benefit of the handicapped will promptly secure him a chance to work at something, even though it brings him half a loaf instead of a whole one. Not only are hospitals and asylums providing suitable work for their partly disabled charges, but there is on the way a larger movement which will some day meet in really adequate fashion the needs for the handicapped everywhere.

There are two principal reasons why an injured man should be given something to do as soon as possible after his injury. The first and perhaps the most pressing reason is that he should not degenerate and become a chronic invalid as he is very likely to do when his faculties are not used. The second reason is directly in the interest of private and public economy. According to our present system of compensation the injured employee often receives through the insurance companies a certain proportion of his wages while he is disabled. It has been found that the time of disablement is often unnecessarily prolonged by

the disinclination or the apparent inability of the patient to work again. This is not always the patient's fault because in many cases the initiative fails and the injury may easily be such as to make possible progress difficult. It has been suggested that experimental workshops be provided covering a variety of trades; workshops under medical supervision where the sick or injured may be given instruction and help along the lines of returning efficiency. In these shops it would soon become evident if the old trade could ever be used again, and it would also be possible in many instances to adapt the individual to some new occupation.

The experimental workshop at the Massachusetts General Hospital has already demonstrated in a number of cases the soundness of this idea. During the past year one of the liability companies paid indemnity for many months to a young woman who had received a cut across the palm of the hand. This girl happened to be of an hysterical tendency, so that beside the actual difficulty of working with stiffened tendons after the cut had healed, she would become hysterical at the slightest manual effort and progress would cease. She was in-

troduced to the workshop which is a part of the hospital organization. She realized that she was under medical supervision and was not so much afraid as she would have been in other circumstances. She was given, more or less under protest, a little simple work to do in connection with the flower pot industry which is being carried on at the hospital. At first she could not use the injured hand at all, but worked with the other. By degrees it became convenient for her to steady the work with the injured hand, and finally to perform slight progressive motions with it. In the course of a few weeks she was using the hand satisfactorily and has since gone back to her old employment. The unnecessary delay was in no sense the fault of the patient who might never have been able to use the hand except through some such gradually progressive and carefully guarded method as this. A man, the subject of mild multiple arthritis, had been obliged to give up his work as a cooper. It was evident that he could not for a long time at least go back to that rather strenuous occupation. He had been given all kinds of the regular treatment including massage, electrical, and the

Zandar machines, without much improvement. In the shop he began working at fairly simple tasks requiring slight motions of the hands. The interest in the work became considerable and by degrees he was able to increase the motions of his joints until finally he was equal to a full day's work at a special cement working occupation. He has since found permanent and lucrative employment in an outside shop doing the same kind of work. The reason for his improvement is at first not evident because the stiffened joints of rheumatism are supposed to be very difficult to relieve. The fact was that the man without realizing it was protecting his joints against the pain of motion. He was afraid to use them as much as he could. The interest of the work overcame that fear and the joints were at once more effective. Gradual use overcame most of the remaining difficulty. These are, of course, especially favorable cases but they are typical of a great many that could be benefited and even restored to full usefulness by the use of modified occupation which is at first easily within the compass of crippled joints and minds.

It is, of course, evident that the restoration

of disabled workmen to even partially remunerative labor means the relief of economic strain. The time has come, if it is not already here, when the demands upon the family, the state, and upon industries for charitable or semi-charitable support of injured and disabled workmen will be a serious burden. In the workshop of the Massachusetts General Hospital it has been possible through the sale of manufactured products to pay the men and women employed in making the cement flower pots a dollar a day during the time of partial disability. A considerable proportion of them have been graduated into better jobs. The workshop has become in a small way a laboratory where part time workers can be studied with the idea of finding new occupations and of reducing the time of disability.

The principle which applies so clearly to the large industrial problems applies also with equal force to the individual who has failed in life and who needs to be put on his feet. This individual problem involves not only the pressing financial difficulty but the moral situation as well. Few of us are able to be idle successfully. Prolonged idleness almost always means

unhappiness and degeneration. Thousands of men and women throughout the country who have failed in their first attempt at livelihood need to be studied and directed into possible channels of success. A sort of revocational system is needed. Every one recognizes the advantages to be gained from vocational study and training in youth. Is there not even a greater need of similar study and direction when in spite of early hopes and ambitions failure has come whether through illness or accident or through unfortunate choice of occupation?

The work cure idea has advanced very rapidly in the past few years, especially in the sanatoria for the treatment of nervous exhaustion in its various forms. It has become evident that the disability of nervous exhaustion, real and undeniable as it is, may be rapidly overcome in a great proportion of the cases by systematic work planned in such a way as to avoid overstrain and discouragement. It has been found that many of the symptoms of nervous exhaustion, the lack of initiative, the sense of fatigue, irritability and fear, will be modified in a most astonishing manner when the patient

has become efficient along some simple line of work. Of course, the work must be different from that which has been customary. Among brain workers the work must be largely physical; and among those who have worked with their hands, it must usually be simpler and more primitive than that which has produced the fatigue. In connection with ordinary medical treatment and with baths and special sanatorium management, systematic work will give a sure foundation for mental and nervous control. A man who has given out in business comes to the sanatorium. Instead of being allowed to worry and fret about his business, he is given some simple work to do. Perhaps he becomes an amateur blacksmith or a hand weaver. The mental strain is relieved, the physique improves, and the cure is often permanent. Beside that, the patient has acquired a new interest, an avocation which will always be useful to him as an offset against mental and nervous fatigue.

The casual reader may wonder how a livelihood is to be made from the crafts described in this book, and it undoubtedly is true that only in occasional instances will these crafts prove

wholly self supporting. But if they help to keep the wolf from the door, if they restore confidence and courage, if they do in some measure reduce the burden of public and industrial obligation to the handicapped, they will serve a most valuable purpose. Because the book is intended for the use of pupils as well as teachers, its phraseology has been kept simple and untechnical as far as possible. Some of the crafts described can be successfully carried on without trained teaching, but it is becoming increasingly possible to obtain teachers for the handicapped. The sanatorium workshop at Marblehead, Massachusetts, under the control of Dr. Hall, is training teachers as fast as possible to meet the needs of hospital and asylum industries. Other institutions should take up this normal-school idea so that in days to come there will be no lack of skilled direction for handicapped labor. Patients themselves may easily become teachers and in this way succeed in saving not only themselves but many others from the dangers and positive harms of idleness. In all large cities there are craftsmen who will for a consideration give lessons. Usually they have not the patience to

teach invalids but it should be possible for prospective teachers to obtain a knowledge of weaving, or bookbinding, for instance, so that they may become teachers of invalids.

The writers take pleasure in acknowledging the valuable assistance of a considerable group of craftsmen and designers, all of whom are mentioned in "The Work of Our Hands." Acknowledgment is also made to the Massachusetts General Hospital for the privilege of referring to cases treated there.

Thanks should also be extended to the Craftsman Publishing Company for the courtesy of reproducing both printed matter and illustrations.

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HANDICRAFTS FOR THE
HANDICAPPED

GENERAL SUMMARY

Blessed is the man that has found his work, let him ask no other blessedness.—*Thomas Carlyle.*

Pessimists so often point out to us the worn-out drudge, earning his bread by the sweat of his brow, that it is a relief to look at the reverse of the medal, and see the worker whose toil is his pleasure, who “rejoiceth as a strong man to run a race.” The weaver of old, the potter, the metal worker, all those craftworkers about whom primitive life centered, seem to have enjoyed their work, for they made it not only firm and durable, but they embellished it with quaint and often lovely ornamentation. As Jean François Millet said: “It is the treating of the commonplace with the feeling of the sublime that gives to art its true value.”

Among these ancient handicrafts there are many which cannot be replaced by machinery, or in which there is always a demand for exceptionally beautiful pieces done by hand.

Weaving, basketry and cement work are well suited for such craftsmanship, and are also lucrative. Lace making, on the other hand, affords a field for fine workmanship, but is a poorly paid craft in America. The same is true of wood-carving. Printing is interesting and lucrative, but is better suited to the patients in State Hospitals for the Insane, or to crippled workers than to neurasthenics. Book-binding is well suited to invalid workers in their own houses, as well as to shop workers.

HANDICRAFTS FOR THE HANDICAPPED

CHAPTER I

BASKETRY

A craft of great utility, and possible for many types of handicapped workers.

a. Reed or woven baskets.

Materials used, and methods of handling, starting round and oblong baskets, borders, etc.

Illustrations of melon-shaped baskets, cut-flower holders, jardinières, etc.

b. Sewed or coiled baskets.

Typical Indian methods of basket making. Materials used—raffia as a substitute.

Making a Navajo stitch bowl basket and a Pomo Bam Tush twined basket.

Illustrations of stitches, and of finished baskets.

I

BASKETRY

BASKETRY is one of the most satisfactory of crafts, as good baskets are in demand everywhere, the materials are easily obtainable and the work itself is interesting, affords an expression of artistic ability, and is not too difficult for cripples or invalids to undertake successfully.

Melon shaped baskets such as are made by the Kentucky mountaineers, and by the Canadian habitants, are always salable anywhere, and there are certain other types such as work baskets, scrap baskets, etc., always in demand, and so easy to make that it is not necessary to give detailed instructions further than to explain the various weaves used.

The most of the baskets illustrated were made by old crippled men in the Lincoln Hospital and Home in New York City—they regularly supply a garden store with large flower

baskets, a florist with holders for cut flowers, and a candy and bonbon shop with candy baskets of reed. Some workers confine their efforts to very fine sewed or coiled raffia baskets which sell for from five to ten dollars each. As soon as the workers became proficient their work found a ready market. Experiments are now being made by them with baskets of native materials, such as maple splints, rush and corn husks.

WOVEN BASKETS

Baskets are, and have been from time immemorial, so essential in the carrying on of our domestic life, that it is worth considering what styles are most suitable for various purposes, and what pleasures and profit may be derived from making them. The accompanying cuts are of simple reed baskets suitable for country use. While of unpretentious design and of inexpensive material, they offer suggestions for receptacles for flowers and vegetables which may be elaborated to suit the worker's individual taste.

The great secrets of success in basketry are careful judgment as to form (and in this the

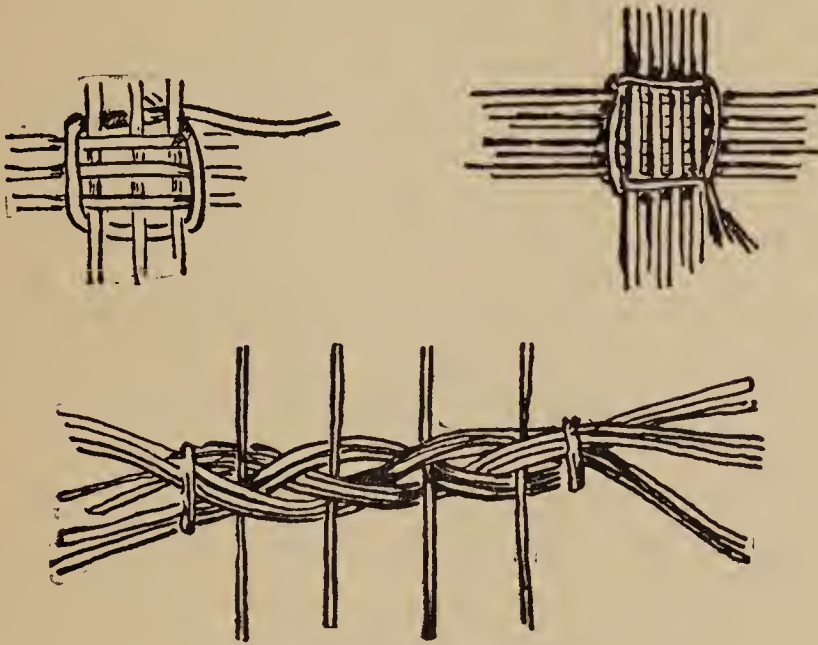
fitness for purpose must be considered) and neatness of execution. A basket may be coarse, done with large material, and yet not produce a rough effect; but it must be solid, and tightly woven or it will soon begin to yield and grow “wobbly” when it is used. The work depends so much on the care of materials and the patience of the worker, and so little on tools—all that are needed being a pair of scissors, a rule, and a coarse knitting needle—that it is well to emphasize the importance of a little time being spent in getting the reeds just right before starting to weave.

A few general remarks may be helpful in regard to the choice and preparation of material. Reed, varying in size from No. 00, which is about as thick as knitting cotton, to No. 6, which is as large as a lead pencil, may be procured by the pound from kindergarten supply stores. In selecting it, care should be taken to get bundles in which the strands are white and flexible. Nos. 2, 4 and 5 are suitable for the baskets shown here. If it is desirable to introduce color, the completed basket may be dipped in dye or painted, but it is well to limit the color schemes to greens and browns.

In working in a pattern in color, dyed reed may be used. So-called Easy Dye, and Rainbow Dye, of light green, afford pleasing shades, and if the reed is boiled about ten minutes in the dye, the color will be fairly permanent. Golden brown in the same dyes is satisfactory. For those who are so fortunate as to know the old methods for dyeing with walnut bark, saffron, logwood, etc., artistic effects may be promised which will more than repay the labor expended; but color should be used sparingly, and in lines and simple bandings, rather than in elaborate patterns. Perfection of execution is due largely to the condition of the material when the work is being done. The reeds must be rolled two or three at a time into coils, and soaked about ten minutes in hot water until they become pliable, to insure a fine tight weave. The accompanying pen and ink sketches show the method of starting the round bottomed baskets. The oval-bottomed flower baskets are more difficult, and should not be attempted until some skill has been attained. The drop-handled flower basket is a particularly good model, as the

folding handles make it easy to pack in a trunk.

In working at any basket it is well to insert extra spokes where the basket turns up, sticking in each almost to the center of the bottom.



STARTING BASKETS.

ROUND BOTTOM WITH 6 SPOKES.

ROUND BOTTOM WITH 8 SPOKES. OBLONG BOTTOM.

If necessary a knitting needle may be used to enlarge the space before pushing in the spokes. If it is desirable to give a spiral effect in the natural color and brown or green, an uneven number of spokes must be used, with one weaver of white and one of the desired color,

crossing between the spokes. Up and down stripes may be obtained by using an even number of spokes, and weaving with two strands. All such designs should be bordered by a heavy band of the natural color or of the dark color or the pattern will lack character. Beginners should be chary in the use of color.



2 STRAND WEAVE IN 2 COLORS.

3 STRAND (TRIPLE) WEAVE IN 2 COLORS.

Care must be exercised in putting in handles, and in finishing the upper edge. A glance at the cuts shows the handles as being interwoven into the sides of the basket, and a close analysis of the real articles would show the ends as being carried into the bottom so that the basket will hold a considerable weight without the handles pulling loose. In the melon-shaped basket, the handle is part of a circle forming the backbone, so to speak, of the whole structure. Another circle intersecting this forms the top of the sides.



REED BASKETRY.

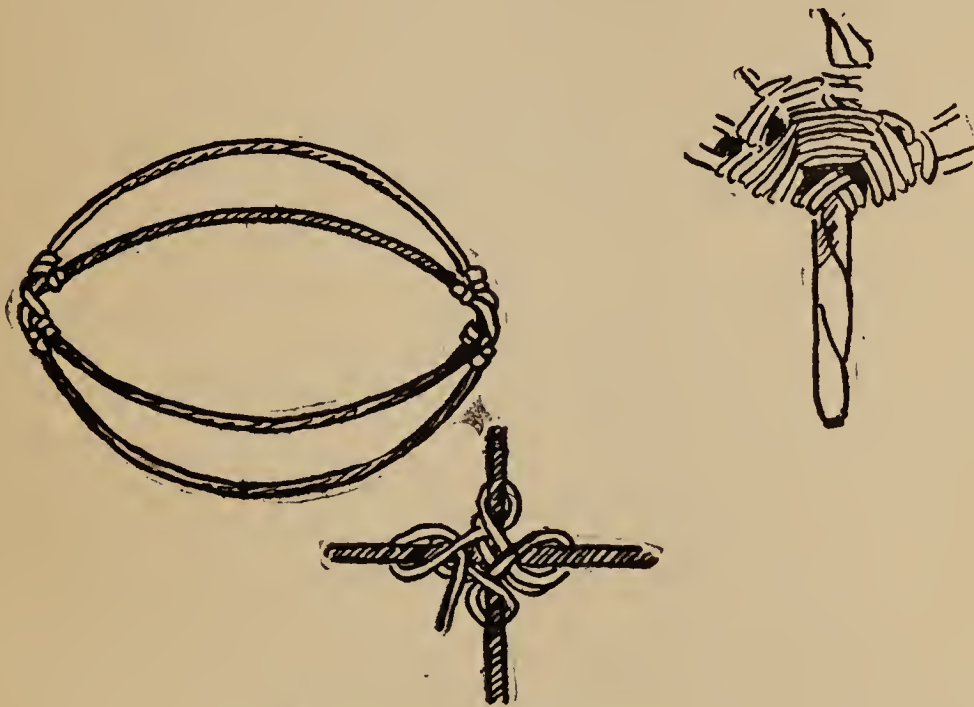
Potato basket

Melon shaped basket.

Oblong flower basket.

Drop handle flower basket.

While all these baskets are for practical use, they are quite unlike in the purposes for which they are intended, and a reed bird's nest or bird-house might, perhaps, be excluded as not being a real basket. It is, however, eminently fitted for country use, and after a few weeks'



MELON-SHAPED BASKET.

exposure to sun and rain, the reed will take on the silvery tones of weather-beaten wood, and seem a part of the landscape. Among our wild birds, bluebirds seem particularly willing to adapt to their own use a ready-made domicile, and even, it is said, to return to the same one year after year. This nest need not be

very large, and may be fastened to a bough within sight of the house, as the bluebirds do not fly from their human neighbors. In Scandinavia such nests are very common, and the return of bird couples among the smaller feathered friends is counted upon, just as is the annual visit of the storks, who find their rooftree homes prepared with a foundation of a cart wheel by their hosts, ready to be added to with each successive spring.

Not only birds, but their natural enemies, cats and dogs, may be provided with home-made resting places. A friend of the author's acquaintance has a tortoise-shell cat which rejoices in a hand-made basket of brown and buff, with a touch of turquoise blue, which looks particularly charming with his tawny coloring. Finding this basket by the fireside, he proceeded to investigate with eyes, nose and claws, and the result being satisfactory, he at once took possession and has used it over two years.

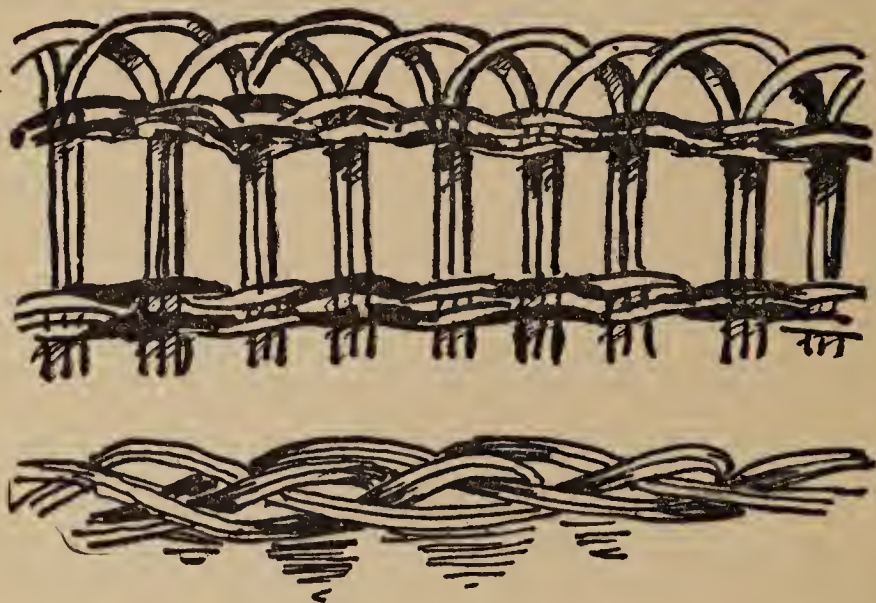
The first requisites of baskets to hold potted plants should be strength and simplicity; coarse materials, No. 5 for spokes and Nos. 3 and 4 for weaving, should be used. A wooden bottom may be used and this adds to the



BASKETS FOR HOLDING CUT FLOWERS

strength of the basket. Basswood of $\frac{3}{8}$ inch thickness makes a good base. The size of the bottom having been decided on (9 or 10 inches would be suitable for a fern, or a small palm), a circle should be drawn on the wood with a compass, and the circular piece sawed out with a keyhole saw. The edges should be filed smooth and sandpapered. Inside this circle from the same center another circle should be drawn $\frac{1}{2}$ inch inside this one, as a guide line along which points can be drawn for holes to be bored. These holes should be not more than $\frac{3}{4}$ inch apart to insure firm weaving. The holes should be bored on the points thus indicated with a bit 1-6 inch in diameter. If it proves difficult to mark the points with a rule, the compass set to $\frac{3}{4}$ inch may be used to "step off" the required points on the guide line. To cut the spokes for a wooden bottomed basket it is necessary to first decide on the height desired, then double this and add one inch for the space between the holes, as each spoke goes from the top of the basket down through a hole, across the bottom of the wood to the next hole and then up. There should, of course, be half as many spokes as there are holes. These

long strips should be cut and rolled and soaked in hot water until pliable. The weavers must also be soft. The weaving may be done with double or triple weave, and a row of open work adds to the effect, as the dull red of the pottery showing through adds a nice note of color. The



BORDERS.

border should be flat, rather than coiled. One of the photographs shows an open weave ornamented by adding spokes to form a cross in each open space. The borders illustrated are all made strong by inserting extra spokes.

Baskets to be used as jardinières may be stiffened by staining with oil paints mixed with



JARDINIERES AND A CUT FLOWER HOLDER.

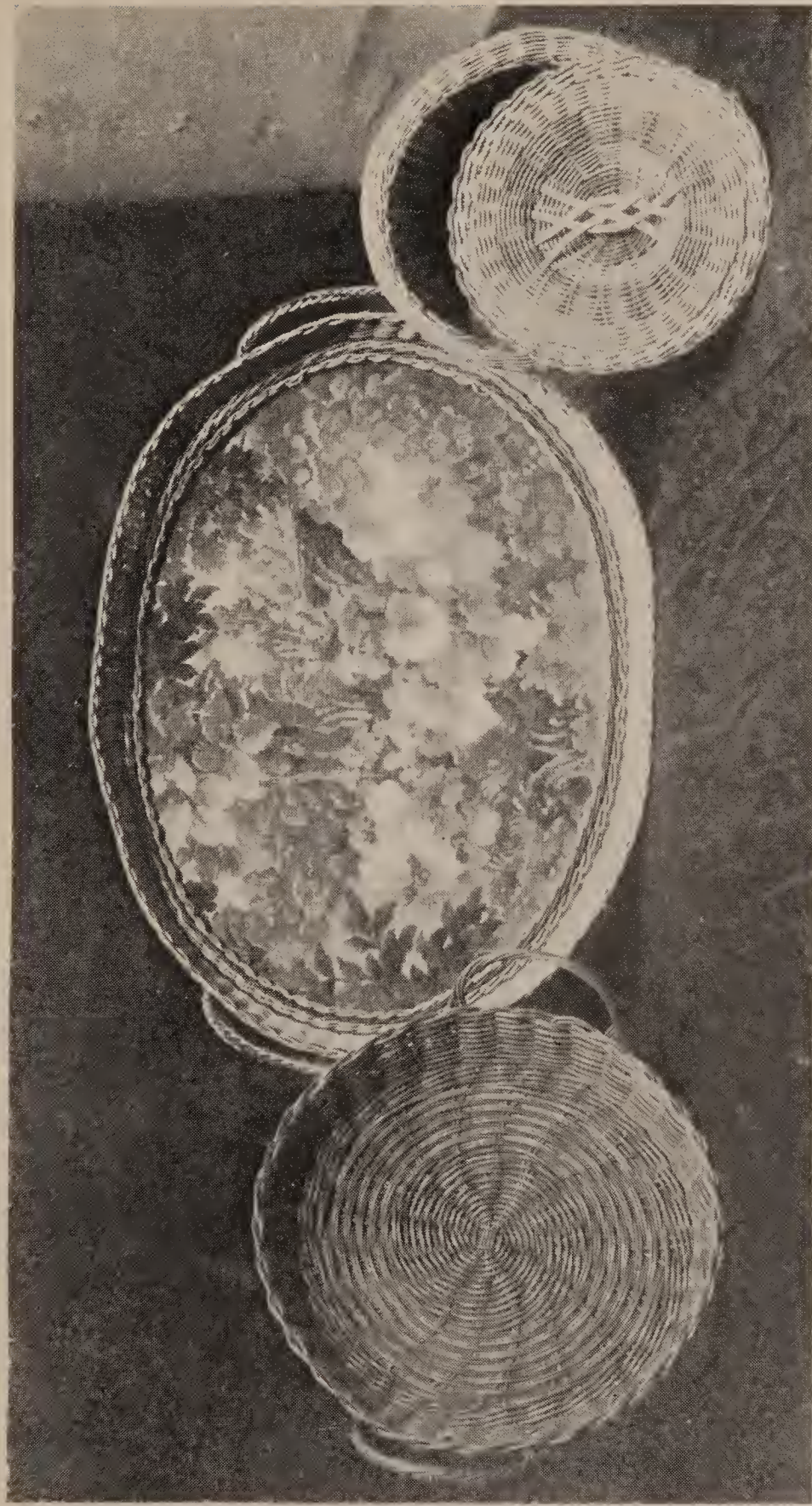
much turpentine to prevent shininess. A very good color combination is that of burnt sienna and Prussian blue mixed so as to give a cloudy effect of greenish brown. This coloring harmonizes with potted ferns as well as flowering plants. The baskets are made less liable to warp by protecting the surface with the oil paint, and as plant baskets are often used on a veranda, this seems worth consideration. If it is desired to conceal the edge of the wooden bottom, this may be done by tacking a braid on, over the edge of the wood, or by putting in extra spokes, short ones, from the back of the basket upward, leaving ends about two inches long, on which a few rows of weaving and a border may be put as shown in the photographic illustrations.

Jardinieres of all reed are rather difficult, on account of the great length of the spokes required, but this difficulty may be obviated by weaving the bottom first, on eight spokes 10 inches long, exactly like the bottom of a small basket. When the weaving has proceeded nearly to the end of the spokes, a strip 14 inches long may be inserted beside each spoke, the basket turned up *omitting* these ends, which

may be cut off or used to form a woven base similar to that already mentioned.

When cut flowers have to be transported from place to place it is desirable to have them protected from light and dust. Two simple baskets are illustrated which may be used for this purpose; one represents a small basket, about 8 inches across, intended especially for the packing of a bunch of violets, the raised cover preventing the crushing of the topmost blossoms. One florist recently used five dozen similar to this. The larger basket allows cut flowers to lie loosely without bending the stems. A side view of this large basket is shown with the *jardinieres*.

These baskets are very suitable to decorate with color. The smaller ones are attractive dipped after they are completed in a soft toned dye bath—baby blue in Diamond Dyes gives a delicate dull blue, and Easy Dye gives tan, dull green and lavender. The latter color and old rose, however, are hard to render permanent on reed. Large baskets are liable to lose their shape if dipped in dye, and are more satisfactory stained with oil paint and turpentine, as described above.



GLASS-BOTTOMED TEA TRAY.
SMALL FLAT BASKETS.

Trays are most fascinating examples of the basket-makers' art. The woven one at the left offers but little difficulty, as it resembles a low, round basket, but the glass bottomed one is quite complex. A wooden bottom must be used to keep the glass in place, and the weaving is done *around* this. To accomplish this, it is necessary to use a large piece of cardboard on which a line is drawn exactly the size of the wooden bottom, to hold the weaving in place. The cardboard is pierced with holes one-half inch apart through which small spokes are run, projecting both above and below the cardboard about 4 inches. The top may then be woven $1\frac{1}{2}$ inches high. The upright ends of the spokes should then be worked down through as far as the wooden bottom and pulled out inside to make a border as illustrated in the photograph. The cardboard may then be pulled out, the glass, cretonne and wooden bottom put in place, and the weaving continued to form the lower part of the tray. A very good finish is made by bending the bottom of the spokes in toward the center, and weaving a border on the bottom of the tray to hold the board solid.

Space cannot be given here to directions for elaborate borders, handles and covers, as only the most elementary principles can be taught in so brief a paper. But the appended illustrations of actual baskets, most of which were made in a home for chronic invalids, will offer suggestion as to the methods of working out the more difficult problems of the fitting of covers and adjusting of suitable handles. The large basket shown in detail, shows an interesting method of dealing with the cover; as this sinking of the handle allows the basket to be packed in a trunk without taking up undue space. The handles of this basket are wound with heavy chair cane. It is also strengthened by cords of No. 6 weave around the sides.

The most interesting feature of all these baskets is the original manner of applying the various weaves, and it is hoped that the reader will devise still more quaint and practical designs.

SEWED OR COILED BASKETS

As this paper aims to give a brief, but definite, description of a few ways of applying Indian basket-makers' methods to our own ma-



TYPES OF SEWED AND TWINED BASKETS.

terials, it may not be amiss to call to mind the two great classes under which all baskets—diverse as they seem—may be grouped.

(1) Those which are twined or woven.

(2) Those which are sewed or coiled.

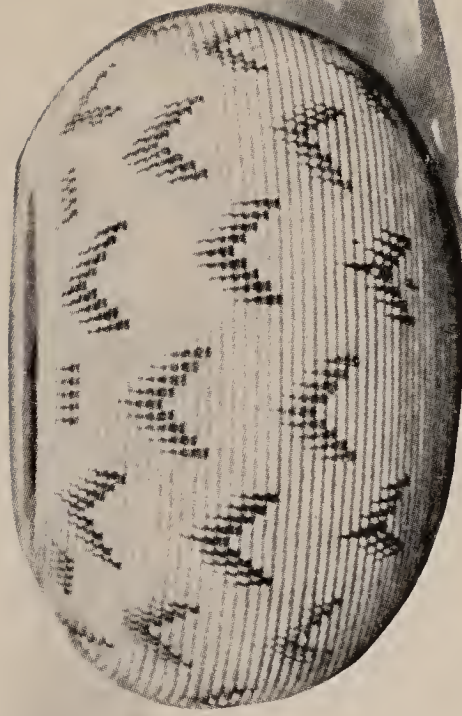
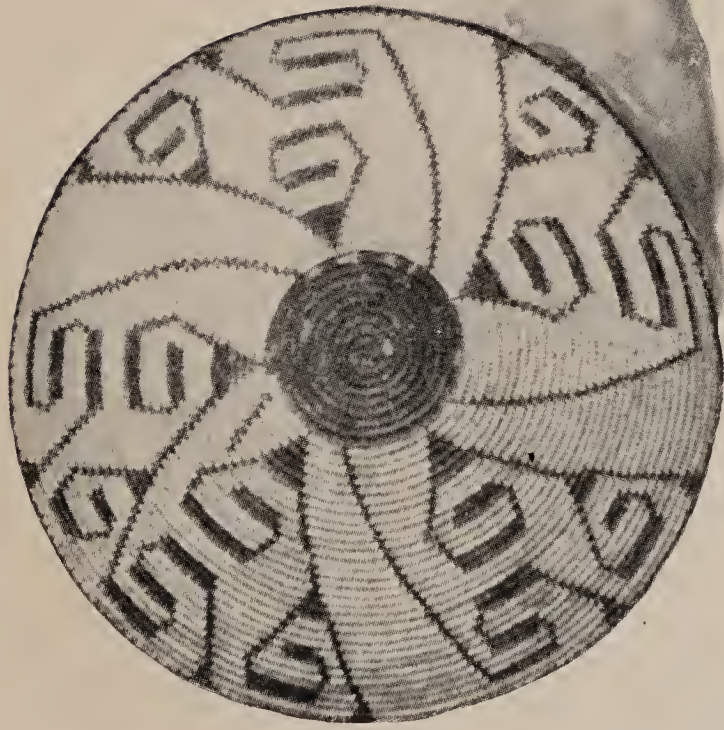
Under the first head are included all such as are made by twining a flexible material around spokes, usually crossing at the center in a wheel-like arrangement, but sometimes forming an ellipse or an oblong. In these baskets the methods of weaving are infinite. Three typical Indian styles are illustrated. Reed and willow baskets are also woven on this principle.

There are many varieties of coiled baskets. Some of the familiar stitches used in them are the "lazy squaw," the "pineapple," the "Mariposa" or "knot stitch," and the "Navajo" or "figure eight" stitch. The "Navajo" is an excellent stitch, as it produces a basket practically water tight and as firm as a rock. It is not confined to the tribe of Navajos, but is used with slight variations by the Apaches, Washoes of Nevada, Tulares, and others.

One of the most famous basket makers in the world is an old Indian woman of the

Washoe tribe named Dat-So-La-Le. Her work commands fabulous prices. One basket contains 50,000 stitches, about thirty to the inch, although it is only seven and one-half inches high and ten across. It sold for \$1,500.00. Her baskets are wonderfully beautiful in form, they also excel in strength, and smoothness of execution. She uses very simple designs, and very few colors, depending on perfection of craftsmanship rather than on elaborate ornamentation. All Indian workers use such materials as are native to the regions where they live, simple grasses and barks, and sometimes twigs. Usually these are of the colors of the desert from which they were gathered, dull browns and blues, and the creamy yellow of the willow twigs from the springs, the reddish brown of red-bud bark, and glossy black of maiden-hair fern. Such as must be dyed are prepared with vegetable dyes, which only deepen with age, but these, too, are of the same scheme of brown, worked into a ground work of cream color.

In the East there are a few native materials in the shape of meadow grasses, corn-husks and rushes, but unless prepared at just the right



SEWED BASKET IN PIMA STYLE. A WASHOE BASKET MADE BY DAT-SO-LA-LE.



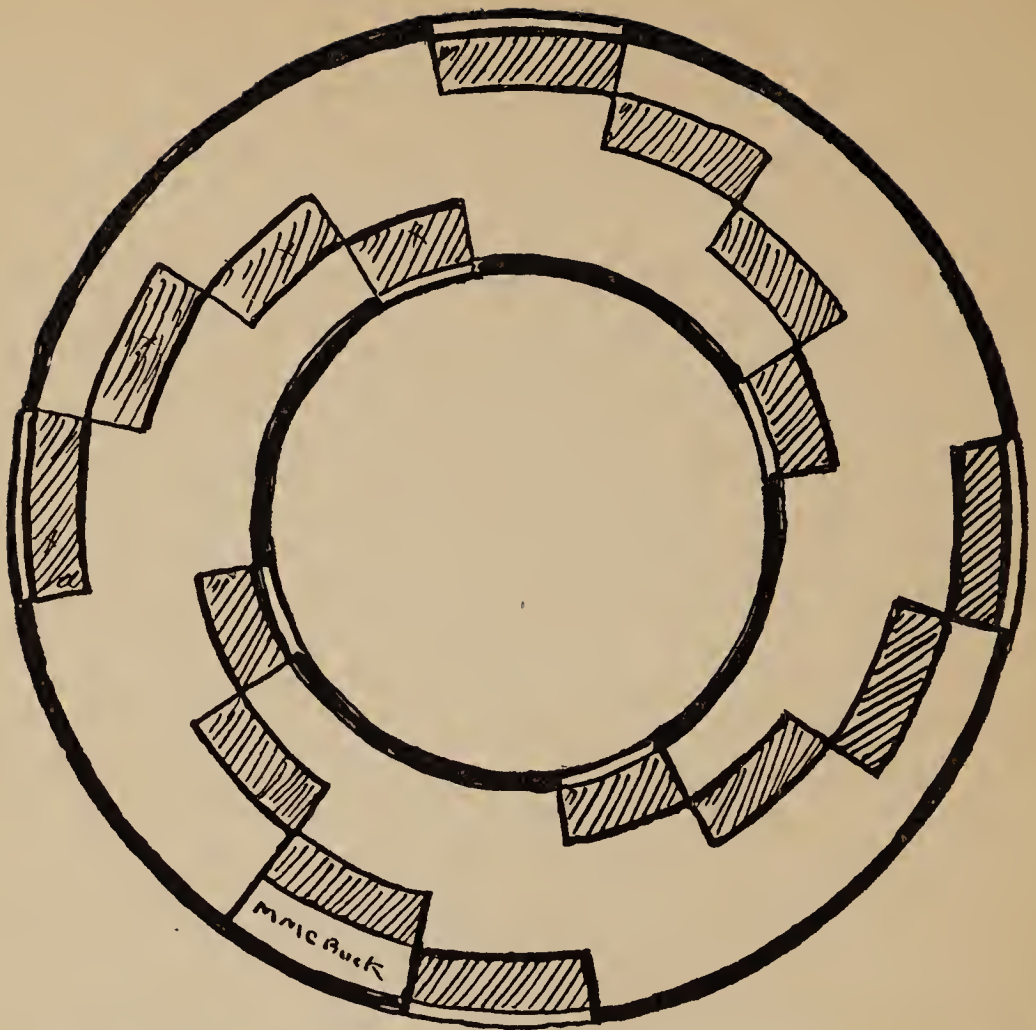
time, they are not satisfactory. Corn-husks are the most satisfactory as they are so easily procured.

Raffia is perhaps the best material for the outer covering in coiled baskets, but it should be confined more or less to the color scheme of the Indians, the natural color for a basis, with touches of tan, brownish red, golden brown and a little black. Olive in a dull tone can also be used. Natural raffia can be obtained from a florist at about twenty cents a pound. It should be washed with soap, well rinsed, and hung in the sunshine to dry.

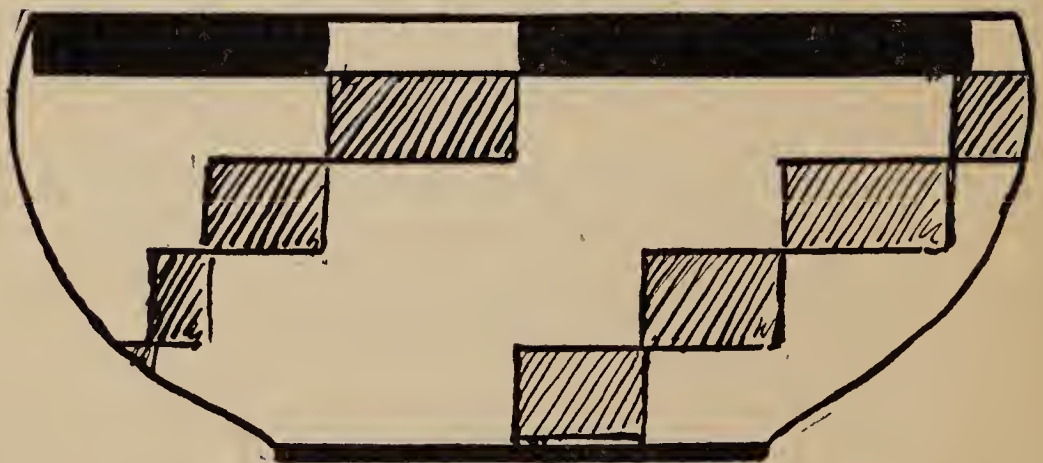
No. 2 reed is a good average size. A basket made in this number in Navajo stitch should be practically water-tight. A very simple design is given of a Tulare bowl-basket. The reed used must be soaked for ten minutes in warm water, then sharpened to a point.

Thread a needle with the *large* end of a strand of raffia to prevent fraying. The end of the reed is coiled with the fingers into a small spiral.

The center is sewed over and over, the end of the reed always extending to the left. The real figure eight stitch begins at the third row.



TOP VIEW.



FRONT VIEW.

BOWL-SHAPED BASKET IN NAVAJO STITCH.

This stitch is so named because it crosses between two reeds, forming a loop over each, in a perfect figure eight.

The part of the basket sewn is called the coil. It is not always made of reed. Some workers prefer a flexible coil of raffia, corn-husks, or even cord. However, when a new thread is started the ends should be secured by sewing



STARTING OF NAVAJO STITCH BASKET.

them into the coil. The last row of the coil is called the *lower* reed and the reed which is being sewed in, the *upper* reed.

In the figure eight stitch, the thread comes out toward the workers between the two reeds and is carried down in *front* of, *under*, and *behind* the lower reed, coming out again between the two, which completes the first half

of the figure eight. It then goes in *front* of, *over*, and *behind* the upper reed, and comes out again between the two reeds.

The thread must be pulled taut, or the surface will be rough.

To make the bowl-basket illustrated, make a bottom four inches across. Then fill a needle with coarse black cotton and sew two lines of stitches across through the center, at right angles to each other, as shown in the illustration, leaving the needle with natural raffia attached to the basket. Take a thread of dark raffia and sew from the end of one of these guide lines, carrying the light raffia in the coil, to within an inch of the next guide line. Then sew this one inch with the light, carrying the dark in the coil, then again with dark to within one inch of the next guide line. Finish this now to correspond. Start the turn-up of the basket by pulling on the reed. It must turn gradually like a bowl, so do not pull too hard, and hold the reed in position in working the following rows.

To start the oblong designs work over each light space with dark, and fill in between with light. Make five rows like this, the fifth row

will be covered, as each row is gone over twice. To start the next design carry the black one inch to the left of the last design and go around in this way, one inch to the left up each figure. Make five rows like this.

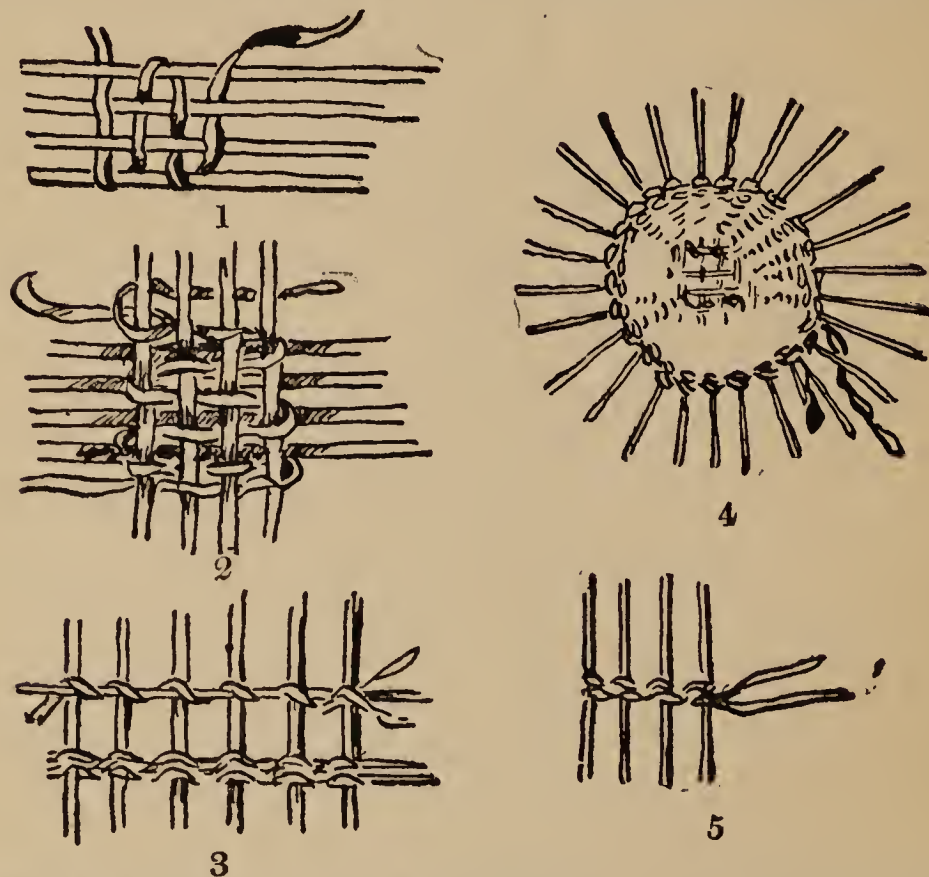
Make the other oblongs in the same way. Four rows from the top begin to pull the reed to make the upper edge curve in.

Sometimes Indians sew in the new threads but leave the ends on the inside to be cut off afterwards. This basket could be worked in black, yellow and natural raffia.

The Pomo twined baskets are famous for their lightness and flexibility. They are made with spokes of the wild grape vine and very close-woven as they are often conical; they are easily carried in a net and form a kind of portable granary. The principle of weaving is always the same, very few spokes are used at the center, and to these are constantly added new ones as the basket grows in size.

Very small reed, number one or what is called "double nought," would answer very well. Cut eight pieces fourteen inches long, and about fifty pieces seven inches long. Take four of the long pieces and weave a strip of

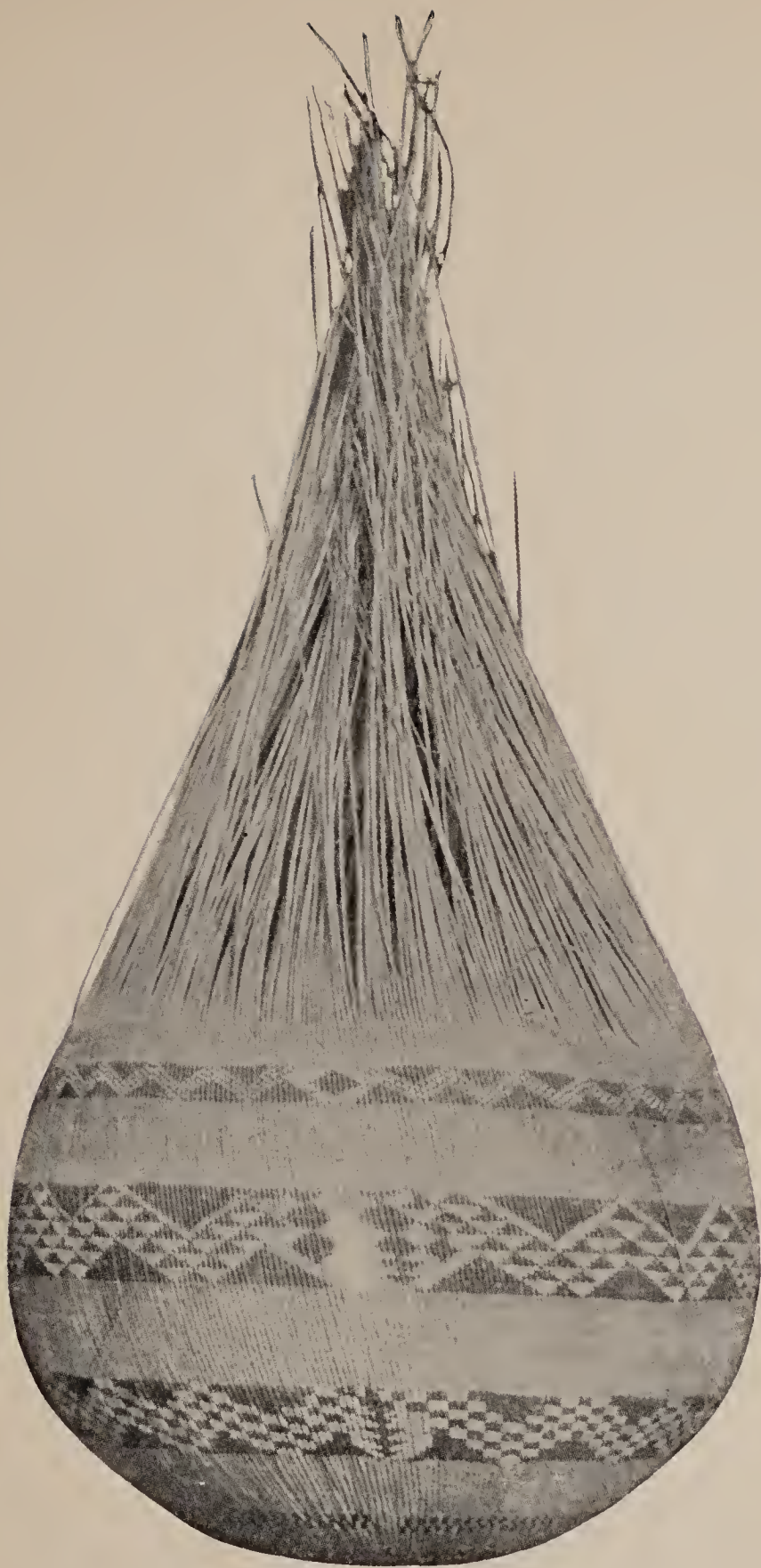
raffia near the center, weave another piece like this and put the two together so that the two ends of raffia come to the same corner. Weave these two ends around and around, crossing them over each spoke. Whenever there is an



POMO BAM TUSH. 1, 2, 3, STARTING. 4, TWINED WEAVE
"WATTLING." 5, "TI" OR "TEE" BAND.

open space stick a sharpened spoke through the last stitch.

After about an inch of weaving, the bottom may be stiffened by putting an extra reed called a "ti" or "tee" on the outside, including



EXAMPLE OF TWINED WEAVING
As used by the Pomo Indians—watertight but
flexible.

it in the weaving. Go two or three times around with this band, as it makes a base into which to stick spokes.

To turn up the basket put in another ti band of three or four rows. This style of weaving can be done to advantage bottom-side up. The Indians do it by fitting the basket on the bottom of a stone jar.

It is better not to attempt a regular pattern or a large basket at first, rather make a small one and weave in bands of color.

CHAPTER II

CHAIR SEATING

a. Cane seating.

Humble industry, but always useful everywhere.

Material, and its use. Illustration of steps in caning
—various weaves. Binding, etc.

b. Rush seating.

Lucrative industry, known to but few, suitable for city
or country workers.

Preparation of rushes.

Method of working, illustrated by sketches.

II

CHAIR SEATING

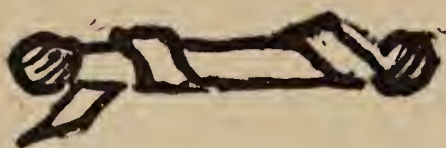
CANING CHAIRS

TWENTY-FIVE or thirty years ago there was in nearly every household some person who understood how to replace the worn-out seat in a "cane-bottom" chair. This useful art was gradually forgotten, but in the recent revival of interest in homely industries cane seating and rush seating have come again to the fore. The following directions, carefully followed, will give good results. Cane is the bark of a long, slender vine, the inside of which is the material which is called reed or rattan. The cane being removed, the rattan is put through a tubular cutter which makes it of the desired size. The cane is sold in bunches of a thousand threads. It comes in several sizes; coarse, medium, fine, and fine-fine being the most used. It is necessary also to have a few threads of

what is called binding cane. In order to use it to the best advantage it should be soaked for a few minutes in warm water and then put to drain in a damp towel. The frame for practice may be purchased at a kindergarten supply store. It is like an empty slate frame, and an old-fashioned slate frame with the regular holes is equally good. It is necessary to have some small pegs to fit these holes to hold the cane in place. If the frame has an uneven number of holes the first line of cane should go from the center front hole to the center back hole. An end three inches long being pushed down through the front hole and pegged in place, the long piece of cane is then pushed down through the center back hole and pegged in place. The weaving then goes up through the next right-hand hole, each successive row being pegged with the pegs from the preceding row. The weaving is then done from the center to the left in the same way. The second process is the weaving across the frame, which is done in the same way, beginning at the center.

The third process is a series of vertical lines, over the first series. By this time there will

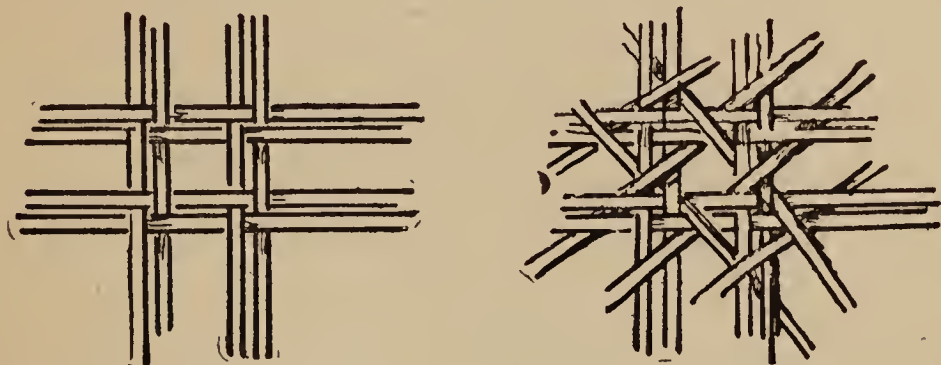
be ends to fasten, which may be done by moistening each with a damp sponge, and wrapping it once around the nearest cane that goes between two holes, as may be seen by reference



FASTENING ENDS.

to a chair. The ends must be securely fastened, and the work should be done carefully. The pegs may be removed after the ends are fastened.

The next weave is the one which beginners usually find the most difficult, and care must



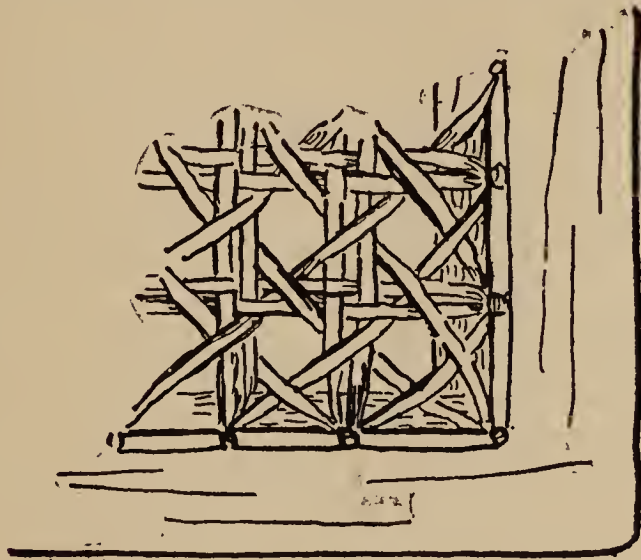
CHAIR CANING.

be taken to avoid mistakes. The weaving should be done with the right hand, the left being kept under the work to guide the point of cane which should be sharpened occasionally.

The work should go from right to left in this order: just below the top row, over an upper vertical, under a lower, across the top row, then thread the cane through the hole, bring it up in the next lower hole, and go back from left to right, just below the second row, the only difference being that the first weave is below the lower vertical instead of over the upper. The rows must form perfect little squares as shown in the sketch, which should be studied closely. When the frame is filled with this weave, the threads may be dampened and pushed with a peg so as to make the work perfectly regular.

The next step is called the oblique weave. It starts first from the lower left corner and goes over two horizontal threads and under two vertical, which will bring it out at the corner diagonally opposite to the one started from. The sketch shows the effect. When these rows are completed weave from the lower right corner to the upper left. When all the threads are completed there remains but the binding to be done. Put one end of binding cane, which must be well soaked in warm water, down through a corner hole and peg it well.

Then take a strip of very fine cane, and thread it up through a hole, over the binding cane, and down through the same hole. This is sometimes called couching, and is very important in holding a chair seat firmly in place. The proc-



BINDING OR COUCHING.

ess in caning a chair is exactly the same as in caning a frame, except that owing to the irregular shape of most chair frames new problems will continually arise to add to the interest of the work. In the first place it is well to try a chair that is approximately square-seated, and it is an excellent plan to have a similar one beside it for reference. The old cane must first be removed with a sharp knife, then every hole must be cleared out with an awl or a hammer

and nail. It is an excellent plan to wash out the holes with weak carbolic, as disease germs lurk in just such places.

The cane used must correspond in size to that taken out. The work must begin in the center as already described. The steps are the same as in the frame, except that at the sides it may be necessary to skip some holes in order to make the rows an even distance apart. The horizontal rows are put in as usual, also the over and under, but in weaving the oblique rows the lines must be kept parallel, and this may necessitate putting two rows into one hole. On a round-seated chair this must be done many times. Sometimes there are places where it is necessary to drive in a wooden plug whittling it off flat, so that it will not interfere with the binding. In many chairs the binding is couched only in every other hole, in this case it must be put in every hole at the corners, as the security of the work depends largely on the binding.

Chair-caning is an excellent physical exercise and calls in play seldom-used muscles, but the worker should be warned against trying to work without a low box or foot-stool, and keeping at it too long at a time until the

muscles are accustomed. It is work that gives great satisfaction, as care and patience give quick returns, and with a few weeks' practice it is possible to obtain results much superior to those seen in nine-tenths of the chairs done by "professionals."

RUSH SEATING

The re-seating of old rush-bottomed chairs is particularly interesting and also very well paid, from \$2.15 to \$2.50 per seat. It requires considerable patience, both in preparing the rushes and in the actual weaving, and long practice to get the smoothness attained by the Colonial rush workers, but it is not as tiring as less sedentary industries, for nearly all the work can be done with the worker comfortably seated. It has also the advantage of being a craft which can be carried on in either the city or country; as there is a demand for it everywhere. The most practical method of getting orders is through an arrangement with some dealer in antique furniture.

The rushes may be procured through such a dealer, but as they consist of ordinary cat-tail leaves, it is easy to procure them in any

inland marsh. (Cat-tails growing near the ocean are brittle.) The rushes should be gathered in early autumn as soon as the tips begin to turn yellow, and should be spread out straight to dry, on boards laid on the floor so there is a circulation of air under them. If it is desirable to keep them green the room should be darkened.

Before using, the rushes should be soaked in a long vessel like a trough or a bathtub, and if this leaves them too moist, they may be run through a wringer. Long fine strands should be selected, two or three being twisted together to make a coil. The twisted rush starts as



RUSH SEATING.

shown in the sketch from the upper right corner, with the end inside. The long end is carried down back of the frame, up, and around

the right hand side of the frame close to the corner, and then crosses the frame to the upper left corner, where the same process is repeated. (In following these directions it will be of assistance to look at an actual rush seated chair for reference.) The same process goes on, new strands being twisted in when necessary to keep the coil even, the ends left under the seat. If the chair seat is wider than it is long, and wider in front than behind, some of the strands going from front to back may be split, and an extra strand of rush added to each portion to fill up the front space. A few coils may be carried from front to back without going across. Ends of rush should be stuffed into the corners to give a slight cushiony effect.

When the chair is completed, the seat should be gone over with colorless shellac.

It is a good idea to try a square frame eight or nine inches across before undertaking a chair, and raffia or very fine corn husks may be substituted for the rush.

CHAPTER III

NETTING

Charming old-time craft used for all kinds of articles, from pudding bags to window curtains. Outdoor use for hammocks, tennis nets, etc.

Illustrated by photographs of netted fringes, etc., and by sketches showing methods of working, and of Colonial designs.

III

NETTING

NETTING is one of the most charming of household arts which our grandmothers loved; forgotten except in villages like old Deerfield, where the excellence of handwork has always been appreciated. Netting was not confined to trimmings; it was used for every kind of indoor article, from a bag to hold the Christmas pudding to curtains for the tester bed. One of the best examples is a dear little cap made for a new baby seventy-five years ago. The net stitch was applied to all sorts of outdoor uses including fly nets to protect the horse in the summer, sacks to hold ears of Indian corn, and little round bags with long handles with which the small boy might go crabbing or minnowing.

It is curious that such a useful art, for netting is both durable and inexpensive, should have been relegated to the fishermen making

or mending their nets, and to the old salts, making hammocks in the Sailors' Snug Harbor while they wait the call to start on the last voyage. It is durable because each stitch is perfect in itself, and if it breaks the web is not loosened, and inexpensive because it requires only cord or thread as material and is made with only two wooden tools, both easily made at home.

With this article are shown sketches of two styles of needle, the larger one for hammocks and all large work, the smaller for lace and fringes. Hard wood should be used; gumwood answers, and holly is also very good; three-sixteenths of an inch thickness makes a large needle. One-half of a pattern may be drawn on a piece of thick manilla paper (which has been doubled and creased) and then cut out, the paper then being unfolded and pressed out. The needle may be cut out with a knife or scroll-saw. This ensures the two sides of the pattern being exactly alike. The mesh stick or block may be of any desired width—one inch is an average size of mesh for a hammock made of seine cord. For finer work a lead pencil is often used for a mesh stick, but for lace, or

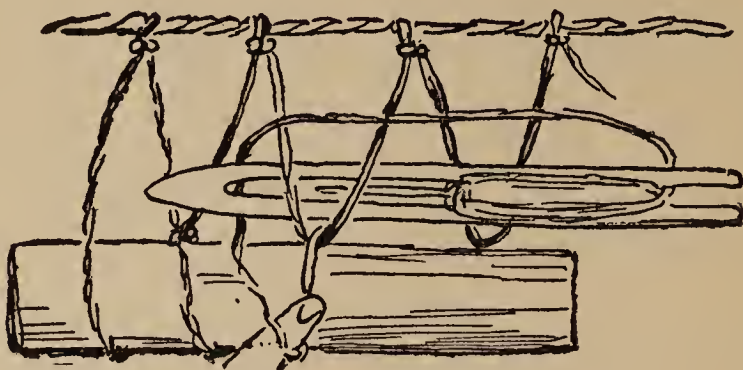
anything made with thread, an even smaller size is required; sometimes in one pattern of lace two or three sizes of mesh are used, each requiring a different stick.

The needles and blocks may be procured for about fifteen cents at any cord store. The cord used for hammocks varies in weight; an average sized soft cotton sells for about twenty-five cents a pound, and two pounds are sufficient.

There should be provided also five yards of "side-cord" and two large iron rings. The materials for a large hammock cost about fifty cents, so it will readily be seen that hammock-making is a fairly profitable industry for women at home, as a hand-made one never brings less than two dollars, and may be as high as three and a half. The plain netting may be varied by the introduction of fancy stitches and knots.

The materials being procured, the cord should be wound into balls and the needles filled as shown in the sketch. The easiest way to make the top of the hammock is, to my mind, to put the requisite number of stitches on a cord stretched between two nails, as at first

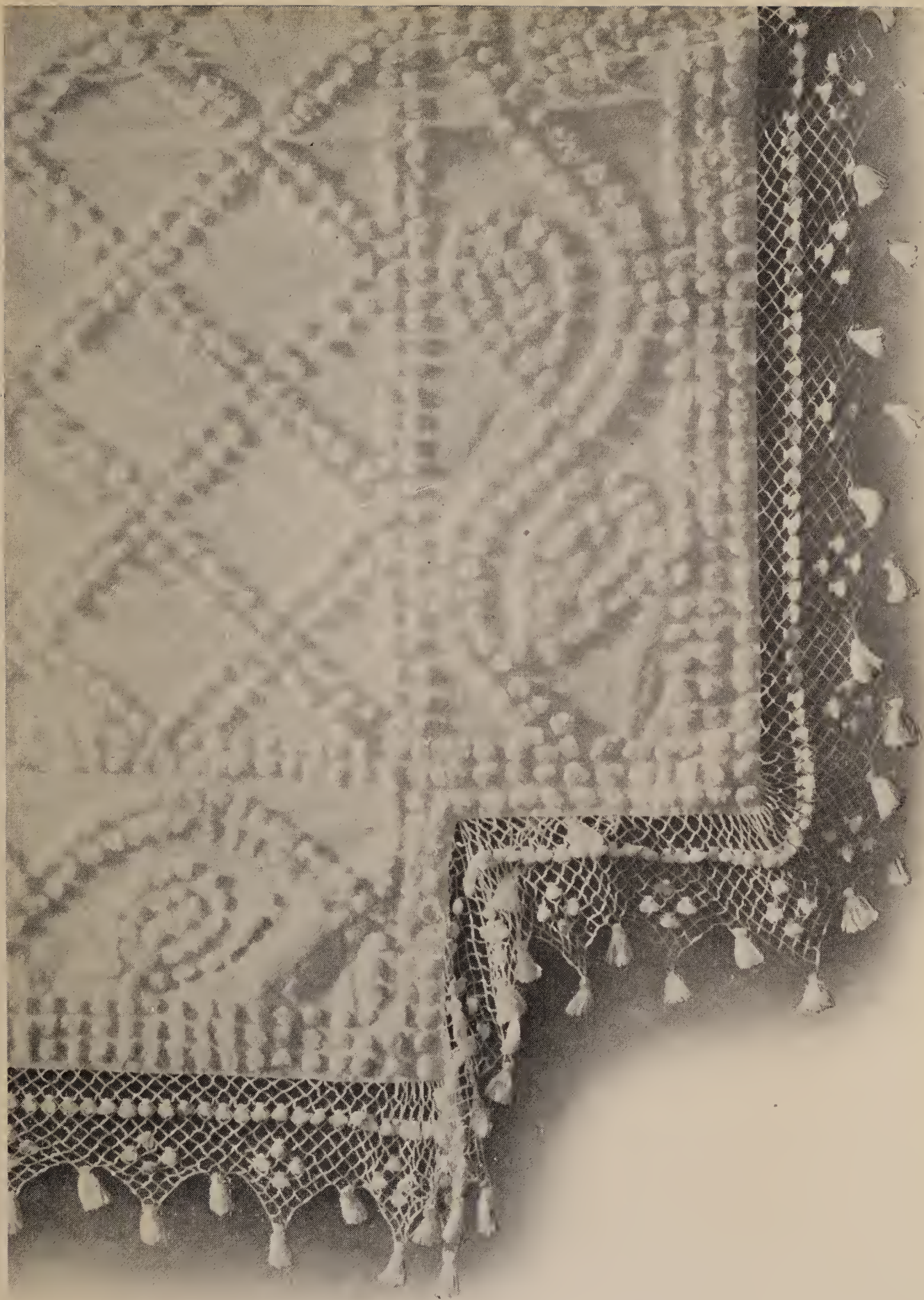
it is easier to see the meshes and avoid mistakes, working in a horizontal line. Forty-two stitches make a good width for a large hammock.



NETTING.

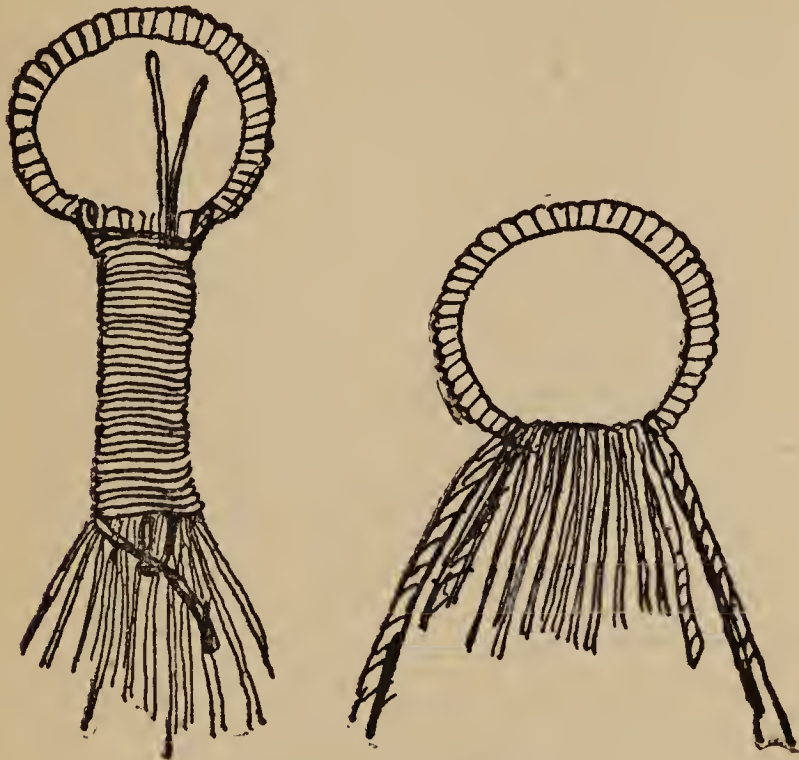
The method of using the needle is shown in one of the sketches better than I can explain it in words, but care must be taken to draw up the thread quickly and firmly so as to avoid a slip-knot. Great care must also be exercised never to slip a knot.

When the first row is finished, the mesh stick being moved along so as to keep it always with at least half a dozen stitches on it, the end loop is left extra long and the new row begun. If necessary, the work may be untied and turned wrong side out so that the worker may always be following from left to right, but it is better to learn to work either way.



TUFTED COVERLID WITH NETTED AND TUFTED FRINGE.

The thread must be joined with care when the needle has to be refilled, by lapping the threads in the center of the knot. When the hammock seems a reasonable length—six and one-half feet is a good size for an adult—the ends should be finished without cutting the cord

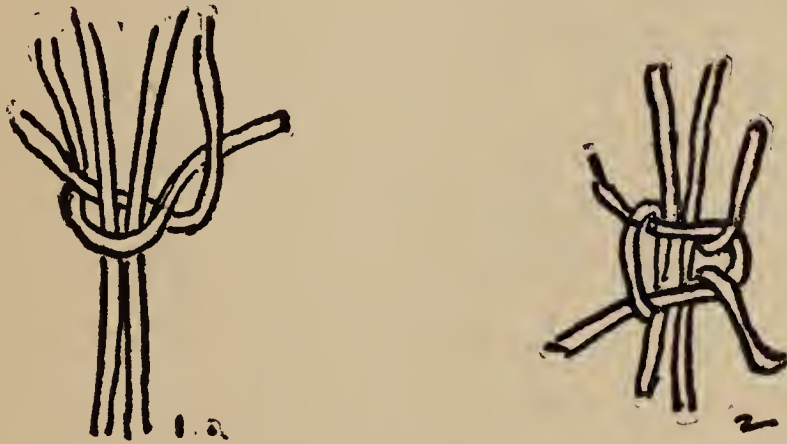


FINISHING HAMMOCK.

at the last mesh. The hammock should be laid on a long table, so that the end meshes extend straight across it two feet from the end. A tack should be driven under the edge of the table to hold the ring. The needle should then go from the end through the ring and back,

then through two meshes, where it is caught with a stitch, then through the ring again, and back through two more meshes, etc. If necessary to tie in a piece do so with a weaver's knot, very near the ring. The thread should finally go up to the ring, and all the threads near the ring should be securely wound; a long piece of cord, say five yards, should be left for this. The "side-cords" must, however, first be put in by lacing one through each side of the hammock, so that they go through the rings, and all loosely knotted around the bunch of threads. The side-cords must be left just loose enough to hold the hammock taut without letting it settle too much in the middle. In winding the ends the same principle may be used that the sailors employ in splicing ropes; that is, the remaining end must be left so it can be pulled under the twist. To do this the end is laid through a loop of cord long enough so the ends extend eight or nine inches along the threads. As the twist is only six inches long this leaves ends projecting. When the twist is long enough the end may be put through the loop, and these ends pulled till the end goes far inside the twist.

Both ends of the hammock should be finished this way, and it will add greatly to the effect if the rings are buttonholed with cord. The hammock may be decorated if desired with little tassels tied into each loop along the sides, or by a knotted fringe. A more elaborate net-stitch is also sometimes used, with a double thread.

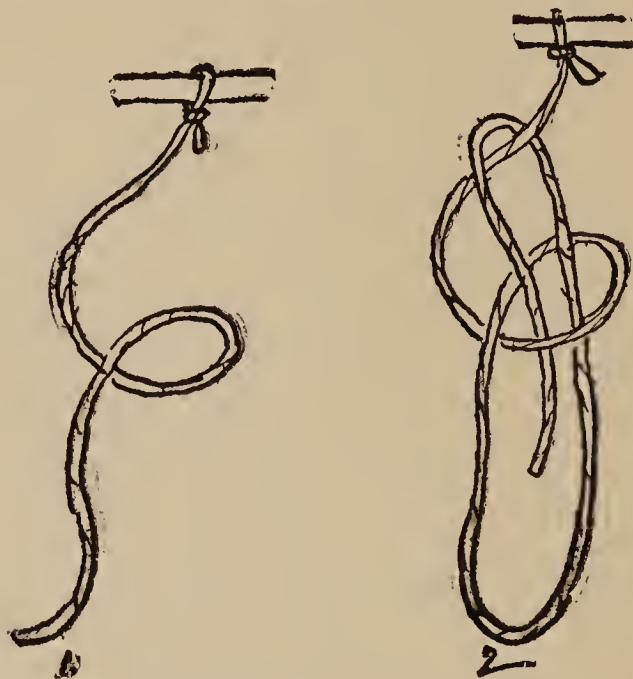


KNOTS USED IN TIED FRINGE (SOLOMON'S KNOT).

Bags of various kinds to hold clothes-pins, dust-cloths, and other household articles, are useful made of the coarse cord used for the hammock. To make a string bag it is necessary to have a wooden hoop; a pair of embroidery hoops from the ten-cent store will supply two bags. On this hoop the first row is knotted, but instead of ending, it goes on around and around till the bag is as deep as

required, when the meshes are gathered in by a string cord, or fastened into a small brass ring by a stitch similar to that used in the ends of the hammock.

Basket-ball nets and some other kinds are cylindrical and do not need to be gathered in.



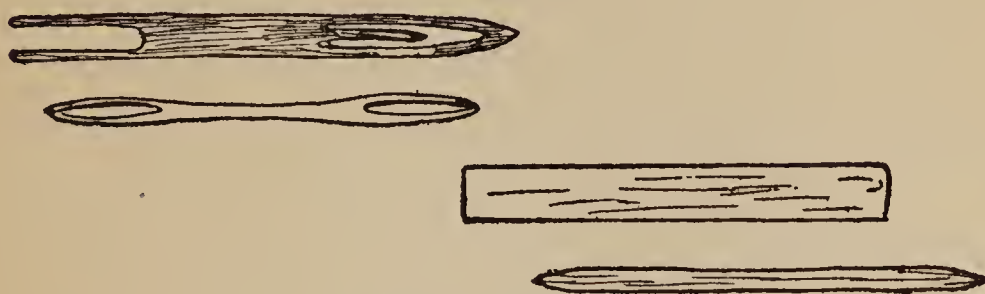
BOW LINE KNOT.

Tennis-nets are pleasant work, as the thread is fastened to a long side-cord by half stitches instead of the side-cord being put in afterward, and this stiff cord makes a firm foundation for the stitches.

In making netted trimmings and laces it is best to have a little ivory needle. A small bone

paper-cutter may be easily shaved into the desired shape and sand-papered. A small ivory block is also very satisfactory.

Linen thread makes very durable lace, but if



NETTING NEEDLES.

something less expensive is required the coarse cotton used for crochet work answers the purpose. The patterns given explain themselves, as they can easily be adapted for various uses. Netted lace makes a particularly good trim-



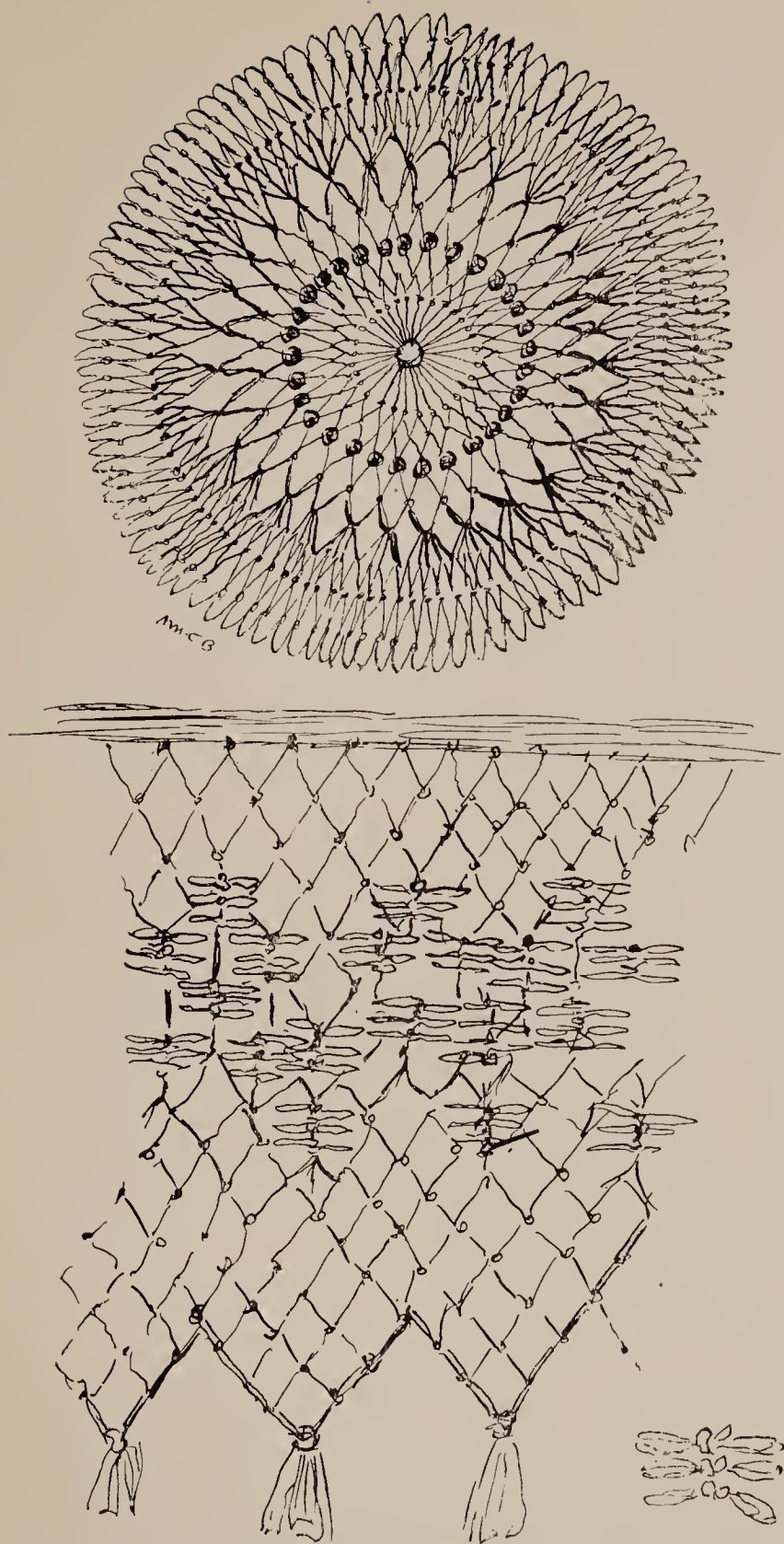
NETTED LOOPS AND BORDERS, USING LOOPS FOR ORNAMENT.

ming for window curtains, as it is delicate and lacy in effect without being perishable. Dresser sets ornamented with it are also very pretty. Made in small meshes, with a design

worked in, it is sufficiently heavy for table linen, and is oftentimes so used, but it seems to me better adapted for more lace-like effects, where filminess rather than heaviness is desired.

Netting adapts itself well to dress trimmings, cuff and collar sets being very pretty. The measure of the wrist must be taken and the netting done round and round, as in a bag, the mesh being very small, and any filling is done in flat rather than tufted work. The ends of the turnover collar should be finished with loops.

One of the daintiest examples of netted work I have ever seen was the baby's cap already mentioned, made of fine linen thread, with a mesh not more than one-fourth of an inch long. The start was made around a tiny button-holed ring, and the back made in a circular piece not more than three inches across. The front was a strip about three inches wide sewed on with a little fulness to this circular piece, for about three-quarters of the way around. The enclosed sketch gives an idea of a suitable design which might be carried out in saddlers' silk or knitting silk,



CENTER OF CHILD'S CAP.
OLD ITALIAN NETTED LACE WITH
TIED-IN PATTERN.

as well as in linen. All designs for netted work should be drawn on paper marked in squares. Reference has already been made to the use of the weaver's knot in fastening threads. It is one of the best methods of tying a new thread to a short end. The Solomon's knot is most effective in tassels, a double thread being looped in the spot desired, thus leaving four ends.

The bow line or bow string knot is good for putting up a hammock as when pulled tight it can not slip. In fact the security of most knots depends upon the tightness with which they are made.

Sometimes, instead of using side-cords in a hammock, a braid or twist of fine cord is used. In this case a pretty fancy twist is made of Solomon's knots repeated. It is necessary to have four very long threads to start on, at least three times as long as the piece required.

An old-fashioned twist cord makes a good side-cord. A piece of ordinary hammock cord is used for this, about three times the length required. One person holds each end, twisting to the right till the cord is kinky the whole

length. It is then doubled, from the center, and naturally coils itself in a perfect twisted cord. Where it is difficult to get supplies or a specially decorative effect is required, one side-cord, with a little extra work, may be used for ropes, side-cords, and everything connected with a hammock.

Sometimes colored cotton wrapping cord is used for nets. For decorative purposes Sea Island cotton answers well enough, but for hammocks to be used out of doors it is not very durable, and is likely to fade, and crack if it becomes damp. In fact plain white or linen color seems far the most satisfactory in fitness to purpose, but if color is required it is better to dye the cord oneself before making up with vegetable dyes for cotton. The cord must afterward be rinsed through many waters. Colors used for carpet warp are generally fast, in brown and gray, and if brighter tones are required logwood, cochineal, and other old-fashioned dyes will answer for dyeing them. To my mind the best color comes from constant exposure to sun and rain till the cord takes on the silver gray tone of an old seine net.

CHAPTER IV

WEAVING

Romantic history of weaving.

Revival of interest in same.

Fascinating craft, allowing change of position and variety of interest, possible for "shut-in" workers.

Method of setting up loom, putting on warp, and starting the weave described.

Photographic illustrations of Colonial looms, and sketches showing the parts and how they are used.

Illustrations of coverlid weaving by a self-taught weaver, and of light weight loom suitable for convalescents.

Therapeutic value of weaving.

IV

WEAVING

THE song of the loom has clicked its staccato music through the primitive history of every nation that has taken part in the early civilization of the world. Poems have been written, ballads sung to it, music composed from romantic memories of it. The histories of epochs have been woven thread by thread on the loom, love stories have been told in its pictures, and the gay and sad ways of a people remembered. The Persian weaves his temple in his prayer rug, and kneels at its gates in his own home. The religion of the Chinese may be read in the rug under the feet of the atheist of to-day. The French court life is portrayed in the tapestries of Aubusson and Beauvais, as clearly as in the paintings of Fragonard.

And so it is of no little interest to know of the looms of the world, and especially of our

own western world. We are proud of our early fabrics and carpets, and we should be equally proud of the methods of their production. Not only are we interested in the loom as a curiosity, but many women to-day taking up weaving with interest are troubled only by the difficulty of setting up a loom and learning to use it. When we consider how primitive women managed to produce fabrics of both beauty and durability out of the grasses and other natural fibers culled in their neighborhood, it seems as if any modern worker, even a "shut-in" woman, ought to be able to master the problems arising in ordinary hand-loom weaving. The processes are not difficult, requiring patience and thoroughness rather than scientific knowledge. This article aims to give a description of the various steps reduced to the lowest terms and in not too technical language.

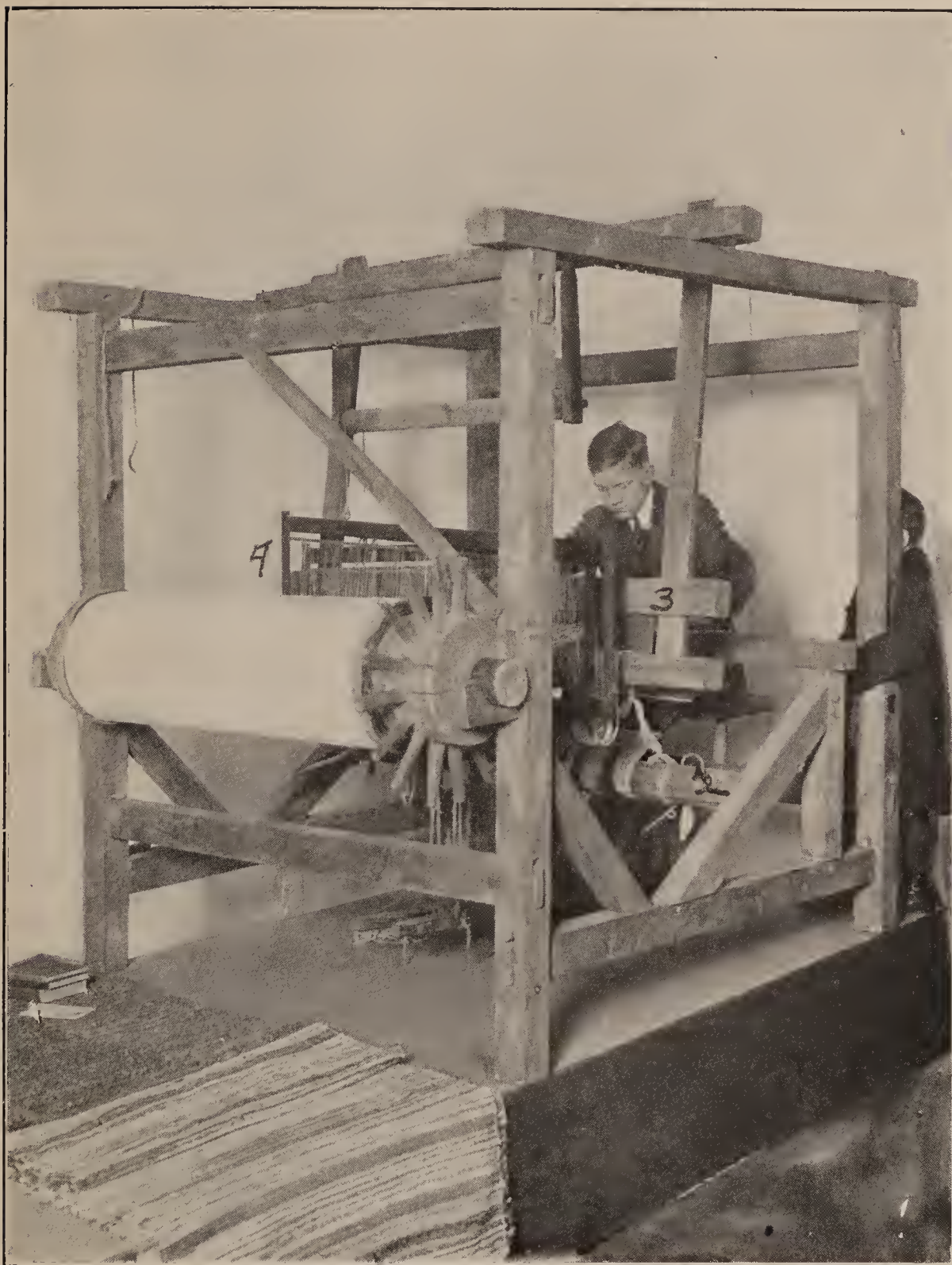
The primitive loom used for rag rugs and simple linen weaving is much the same in construction as those used several hundred years ago. In one of Giotto's paintings of the fourteenth century a loom is represented not unlike those of the present day. The loom then

in use had all the essential parts, and the devices which have been added were intended to save labor, increase the output of work, and extend the possibilities of pattern weaving. Mediæval weavers produced much beautiful pattern work. Some of these designs, handed down from one craftsman to another for seven or eight centuries, remain to us in the intricate blue and white coverlids of Colonial days; in twills or satin weaves and various bird'seye and other small figures now used in machine weaving for table linens and silks. These patterns were seldom written out by any systematic method, but were recorded in a kind of weavers' shorthand to be interpreted only by another weaver, consequently many of them were lost when hand weaving went out of fashion. Notebooks of patterns are sometimes still found in old country attics. Among the Southern mountain folk the traditions of how to "set up" and weave the old designs have been preserved better than elsewhere in this country, so it has been easier there to revive the coverlid and damask designs.

The Century Dictionary defines a loom as

“a machine in which yarn or thread is woven into a fabric by the crossing of threads called chain or warp, running lengthwise, with others called weft, woof or filling.” The machine consists of a solid frame-work, with a roller at each end over which the warp threads are stretched, through a series of eyelets called heddles, and the interstices called dents in a comb called the reed. The frame-work is sometimes arranged so that the threads run up and down, as in the Navajo looms, but the horizontal loom is more used and easier to procure and to manipulate.

The frame of the loom used by country weavers is generally about four and a half or five feet high, four and a half or five feet wide and six feet long. The timbers used are of hard wood five or six inches square, and in the oldest looms hewed out by hand from hickory or oak, finished with mortise and tenon joints, and keyed together with wooden pins. This gives a stable construction, and in some ways such a loom is more desirable than one of smaller size which takes up less room and looks more attractive. The loom illustrated in the large photograph came from central



A TYPICAL COLONIAL LOOM.

1 Yarn beam.
2 Cloth beam.

3 Batten.
4 Heddles.

New Hampshire, where it had lain in the attic disused for sixty years. With a few extra pieces made by a carpenter and a new set of heddles it has proved most satisfactory, and has been used for about five years by a blind man.

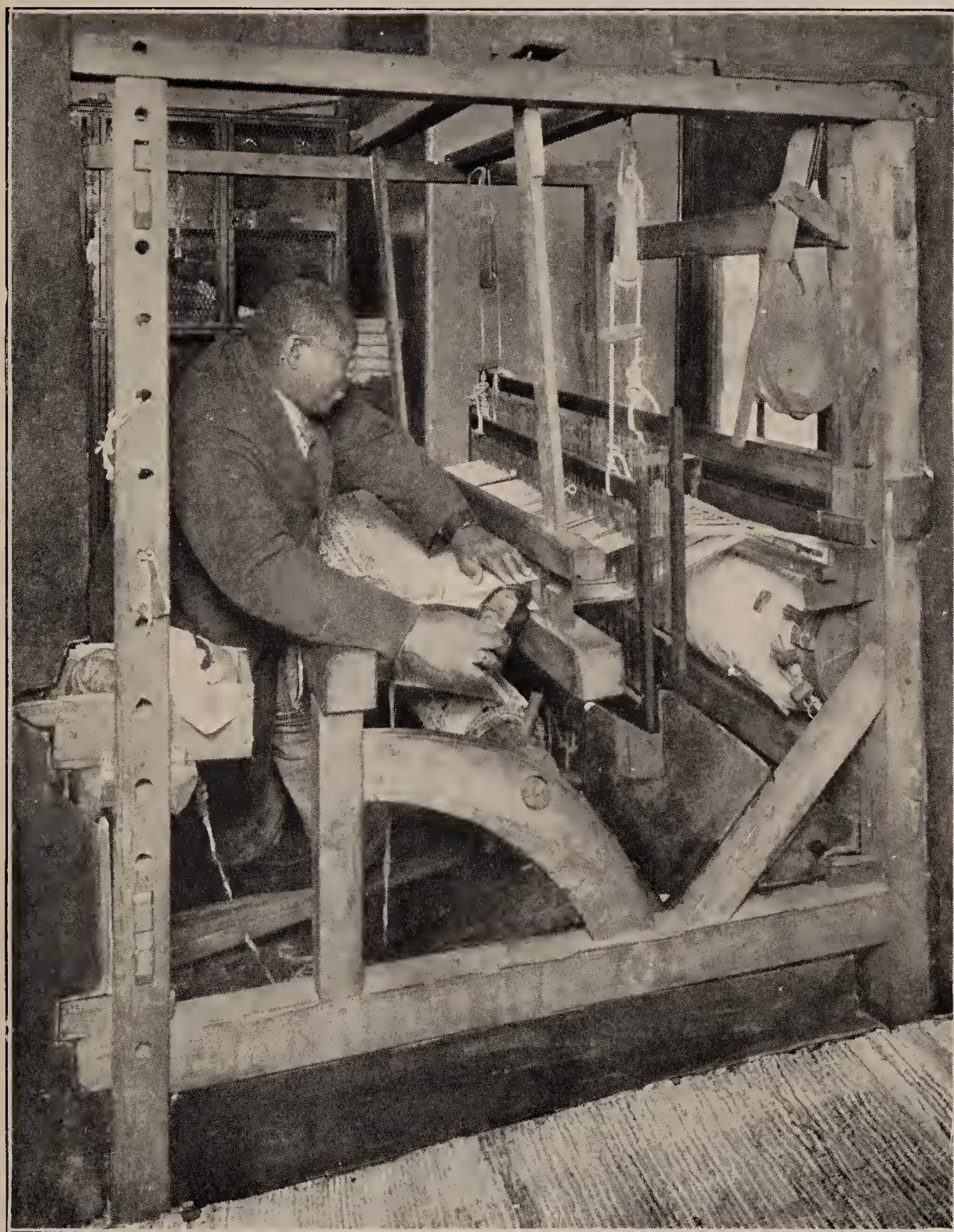
Another of these old looms called "Aunt Debby," over a hundred years old, has proved equally satisfactory. It belonged originally to a village weaver, known to her neighbors as Aunt Debby. When she died she willed her cherished loom, her choicest possession, I almost said *companion*, to her minister. When he was called to another church he left the loom with an old Englishwoman who understood linen weaving. She called the loom "Aunt Debby" for its original owner, and wove hundreds of yards of linen toweling and sheeting. But a few years ago, in her eighty-sixth year, she decided that her weaving days were over, and "Aunt Debby" traveled many miles to a new home, where *she* is good for another century of work as helper to the patients in a sanatorium.

These old looms are easily set up, as the parts are generally numbered to show how they

fit together. In buying one it is necessary to see that no important piece is lacking. One with all essential parts can be procured for about twenty-five dollars.

It will be observed that while the essential parts of the loom are similar, as shown in the accompanying illustrations, there are slight differences in detail. The *harness* or group of heddles is not always swung from the top of the loom in the same way, and the pedals or treadles are attached sometimes at the front, sometimes at the back.

The two *beams* or rollers must be held in slots at each end of the frame work, the front or *cloth beam* must be fixed so as to be held tightly in place by an iron pawl catching into a ratchet. The back or *yarn beam* generally has large pegs by which it can be turned, and a heavy wooden lever to set it and hold the warp taut. The photographs show these two beams, as well as the harness or heddle group, and in front of it the *batten*, which is a swinging frame holding the *reed*, so called because it is used to beat up each row of filling into a close fabric. Lathe or sley is another name for the batten.



AN OLD NEW HAMPSHIRE LOOM
With Blind Tom weaving.

THE OLD LOOMS

In the very oldest looms the method was that of darning, the needle or shuttle was carried over one thread and under another. But in very early times a method was devised to hold up a series of alternate threads. The shuttle was then passed through, and the arrangement of threads changed so that the series which had been above is now below; this process is called shedding. Back of the heddles two sticks are inserted which keep the crossing of the threads perfect. These are called *shed sticks*, or *lease sticks*. The shed is formed in a modern two-heddle loom by drawing up alternate threads by raising the heddle through which they pass. This is done by pressing the foot on one pedal, lowering the corresponding heddle which causes the other to raise. The warp leaving the yarn beam is first threaded through the heddles, sometimes called *healds*, the group of heddles is called the *harness* or *shaft*. The heddles are sometimes made by hand of string, as in the second illustration in which they are made of seine cord. Sometimes they are of cord with a metal eye, and sometimes of brass

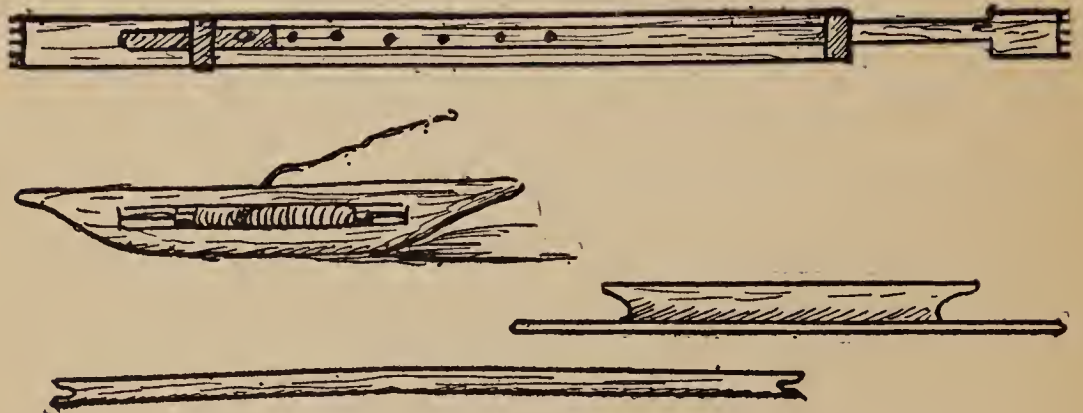
or iron wire. The essential part of the heddle is the mail-eye. The heddles set in frames are much the easiest for an amateur to use.

Directly in front of the heddles is the swing-



A HEDDLE OR HEALD SHOWING THE MAIL EYE.

ing batten or reed frame. Reeds are generally made nowadays of steel, but in Colonial days they were sometimes made of bamboo or whale-



STITCHER AND SHUTTLES.

bone. The warp is threaded through the interstices or *dents* of the reed made by threading two threads in a hole for six or eight dents.

A stretcher with nails at the ends formerly called temple or tenterhook, is used to keep the goods stretched across or of uniform width. The old expression to be "on tenterhooks" possibly arose from this connection with weaving.

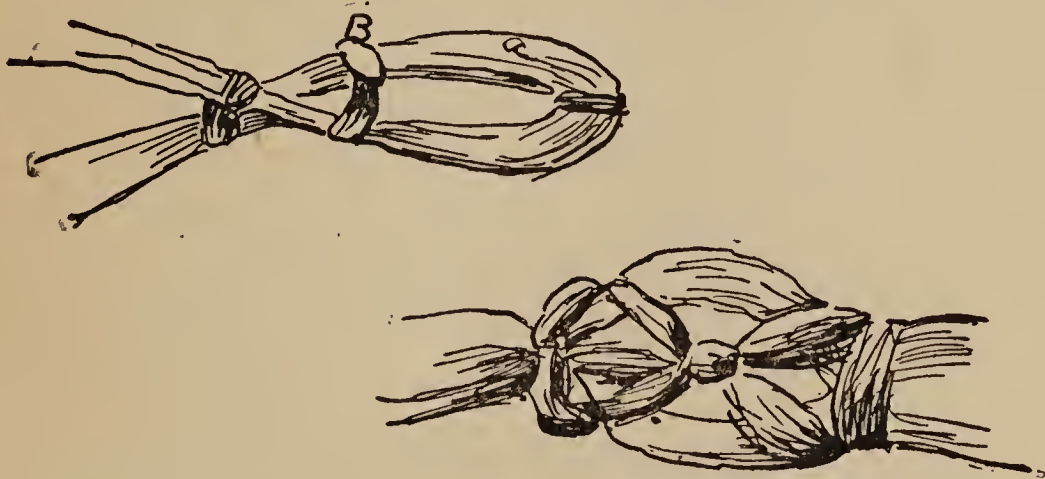
A loom having been obtained and the various parts of the outer frame adjusted, the heddles and reed being left till later, the first step is preparing and putting on the warp. This is frequently done even in schools by a professional weaver, but it is not always convenient to get one when desired. Another plan is to have the warp put on the beam by a professional before the loom is set up. It is, however, much more interesting to do as much as possible one's self and the process of beaming the warp is a particularly fascinating one. The making of a leased warp can also be done by amateurs, but it is wiser not to attempt this on the first warp. Warping consists in arranging in parallel lines as many threads as are required to weave the desired width, and as long as the piece of goods is to be. This must be done a few threads at a time. These threads must be crossed near the end so as to make a crossing similar to that in the shed. A detailed description of this

process will be given later on, but the first warp may be procured ready-made. The number of threads or "ends" required may be estimated by multiplying the number of inches the finished goods is to be by the dents in one inch of the reed. Twelve threads to the inch is an average number for rag weaving. The first warp should be that usually required in rag weaving. A sample from a rag rug may be sent to the dealers. White or cream colored warp is best to begin with. In a piece thirty-six inches wide with twelve threads to the inch, 432 threads would be required; allowing for a few double for the selvage, 450 ends is a good number. Twenty-five yards is as much as a novice can handle easily. The warp can be procured at wholesale rates and delivered express C. O. D. from Tinkler & Co., Philadelphia. It should be stated in ordering that it is to be chained—that is, after the lease is put in the whole warp is chain-stitched at the factory to avoid tangling.

PUTTING ON THE WARP

The principle of the crossed threads must be observed in making the warp. The crossing

in making the warp is generally kept by cords, and a ready-made warp comes from the factory with these threads firmly tied in place. These must be removed before the warp can be spread out on the yarn beam, and this is where amateurs frequently come to grief, by taking out the cords before putting in lease sticks to hold the cross. A very simple method of procedure

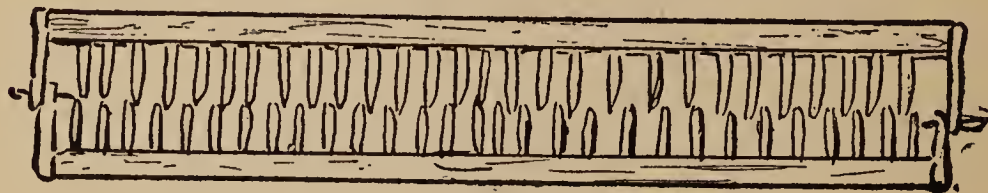


CROSSED OR LEASED WARP AS IT COMES FROM THE FACTORY.
TOP VIEW AND SIDE VIEW.

is to insert long, heavy cords to hold the crossing threads. The warp must be fastened securely to the beam *at the end from which the chain unlaces* (there is sometimes a cross at both ends). Some yarn beams are made with a long stick sunk in a groove, in which case the stick may be slipped through all the loops at the end of the warp, and put back in the

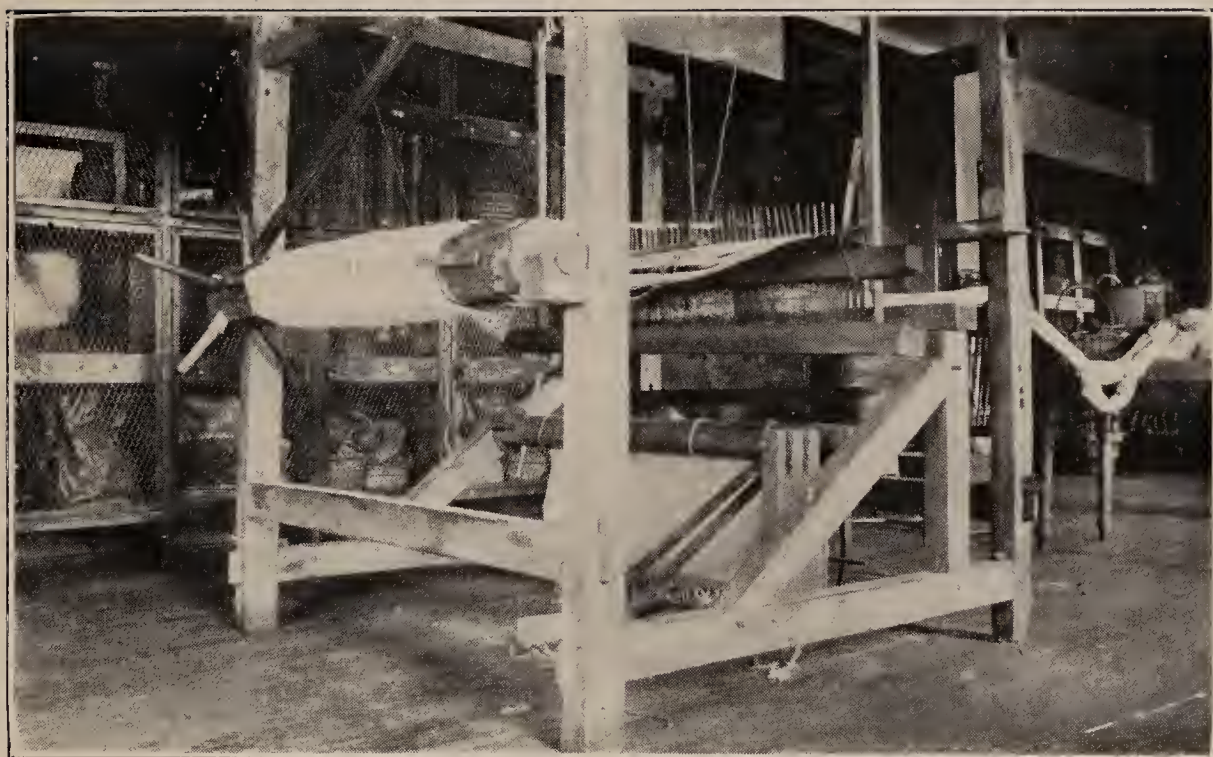
groove. It is tied in place in the groove after the warp is spread out to the desired width. The lease sticks may then be easily put in place, one at a time. They should be tied together, or held with large rubber bands to prevent their slipping.

A very useful device to keep the warp threads from tangling and make them wind smoothly on the yarn beam is a long wooden comb as wide as the loom, called the raddle.



RADDLE.

With it is sometimes used an upper piece which prevents the threads from slipping over the top of the raddle teeth. The raddle is fastened securely across the loom in a vertical position. A very good plan is to fasten it to the upright sides of the batten. A small portion of warp is then unwound from the beam, and the threads are distributed between the teeth of the batten, care being taken to keep them straight from the beam to a corresponding position in the raddle.



PUTTING ON CHAINED WARP.

Note the raddle in position, also the flat sticks under the warp on the beam—used to keep it from settling in.

In order to wind on the warp smoothly without leaving loose threads, it is necessary to get a very even tension. The best way to do this is by winding the chain of warp on a *drum*, but this often is impracticable for an amateur, and the chain can be held firmly enough in the hands of one worker while another turns the beam of the loom and winds on as far as the warp threads are straight. The lease sticks which have been wound with the warp must then be worked back toward the raddle, care being taken to undo gently any little caught places so as not to break the threads. This plan of having the raddle stationary and the lease sticks movable, gives an opportunity to wind on about a yard at a time. The warp on the beam should be kept from settling in by occasionally laying a stick—a curtain stick answers the purpose—along the beam *under* the warp which is about to be wound on. There should be one of these sticks to every six or seven yards of warp. The greatest difficulty which amateurs are likely to encounter is that occasioned by the chain coming undone so that the threads loosen and tangle. Care should be taken not to loosen the chain for more than

a yard or two at a time. A cord tied around the bunch of warp will prevent tangling. If a thread breaks the ends must be tied at once with a weaver's knot.

Putting on, or *beaming the warp*, is sometimes called *warping the beam*. When the warp has been put on smoothly for its entire length with but few knotted threads, it may be said that the multiplication table of home weaving is mastered.

ADJUSTMENT OF HARNESS FOR RAG RUG WEAVING

For plain weaving two heddles are used. The wire ones set in frames are the easiest for amateurs to manage, but string heddles with or without copper mail-eyes work very well. The number of heddles is usually rather greater than that of the warp threads or ends; half should be on each frame. The heddle frames are suspended from a horizontal beam crossing the top of the loom; usually there is a cord arrangement sliding on a pulley at each end of this beam, which allows one heddle to go up while the other goes down. In threading the heddle eyes it is necessary to know the number

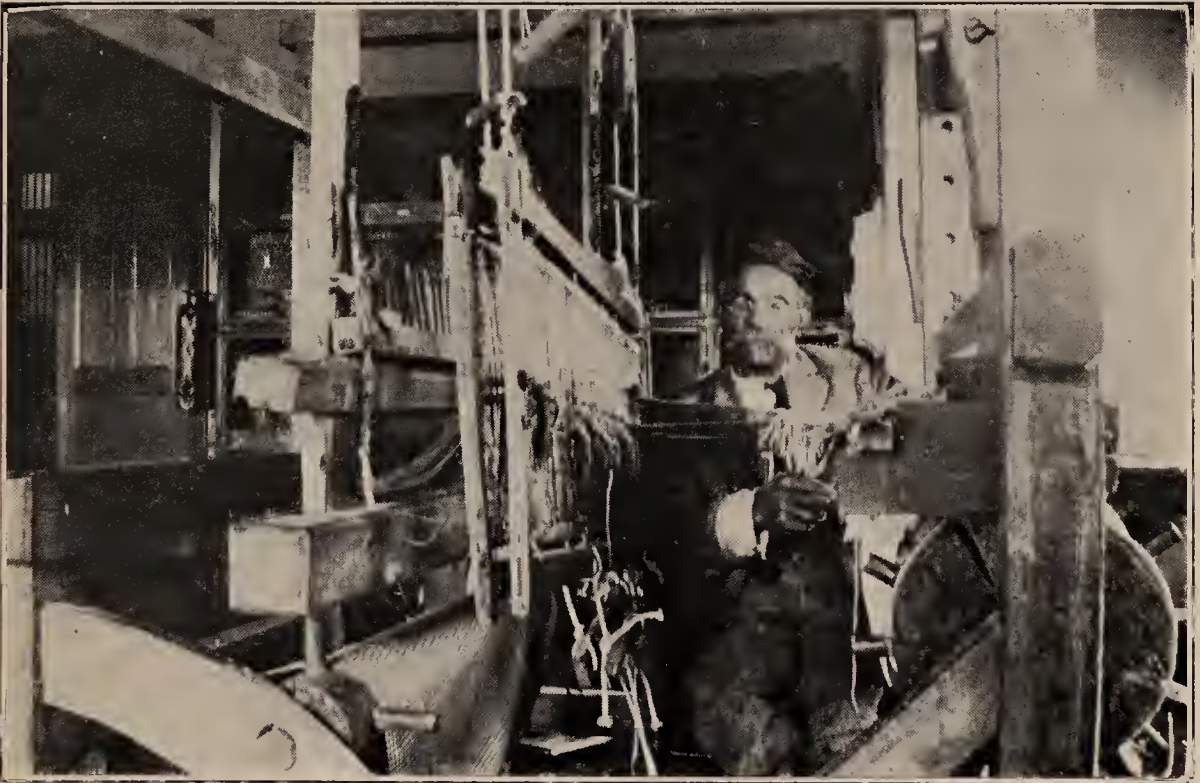
of eyes in each frame, and find the middle eye of each frame. The warp must also be counted and the threading must begin from the center thread. A small hook, called a warp hook, is inserted through the center eye in the front frame and the middle thread caught on it and pulled through. The next thread to the right is then threaded through the eye next to the right in the *back* frame—and this process is continued across the loom, taking each thread in succession. The work should be watched closely, as it is very easy to take two front or two back heddles in succession. The ends should be tied in small bunches in front of the heddles to avoid pulling backwards and unthreading. The last eight or ten ends may be threaded two together to form a *selvage*. The left side should then be threaded, starting from the middle. The mistake to be avoided is that of threads crossing in the heddles. These may be discovered by pushing down the front frame and looking through the shed, then pushing down the back frame. There should be a clear opening across the loom, but if there is a thread in this space a cross is indicated, and the heddles must be re-threaded to correct it; sometimes

two threads only require re-threading. Before the ends are threaded through the reed it is well to examine the heddles straight across the loom to see if there are any errors. It is often necessary for a beginner to do considerable re-threading, or *pulling in*.

The batten is in front of the heddle and is a swinging frame containing the reed. The ends of the warp must be threaded from the middle hole or dent of the reed and go straight from the center of the heddles to the center of the reed. The threading should be done with the warp hook.

When the reed is threaded, and the ends tied to prevent their coming out, the harness must be carefully adjusted so that the threads will run horizontally from the back beam through the heddles and reed to the front beam. The heddle frames are attached to the treadles in a way to give a perfect balance, as shown in the photographs. The batten must swing freely, without striking the heddles or the front beam. This may mean careful adjustment.

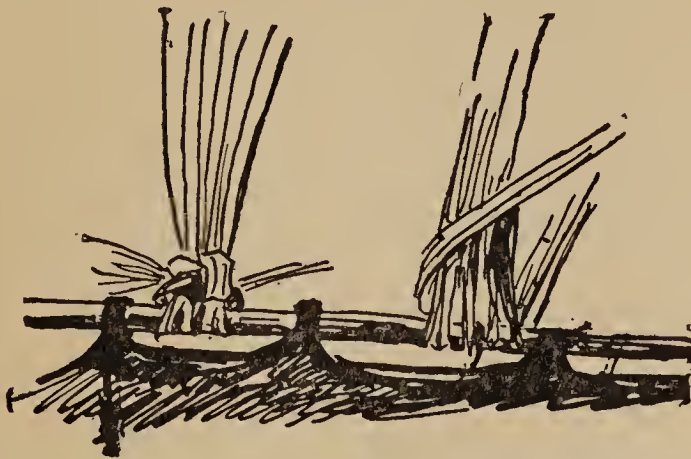
Generally on the front beam there is a series of cords to which the ends of the warp are to be tied, with the knot shown in the sketch, or there



PUTTING ON NEW WARP WITHOUT RE-THREADING THE
HEDDLES.

After the new warp is on the beam each new end is tied to a corresponding old end.

may be a rod run through a piece of strong drilling called an apron to which the ends are tied. Before describing the actual process of weaving it may be stated that after the loom is once threaded it is not necessary to re-thread the harness for every new length of warp.



TYING ENDS OF WARP AT CLOTH BEAM END.

When the warp is woven nearly to the end, instead of pulling out the threads it is better to tie them securely in small bunches in front of the reed and behind the heddles, so they cannot slip through. After the new chain of warp is put on, the new ends may be tied one by one with a weaver's knot to the old ends.

STARTING THE WEAVING

It will be found that the harness needs considerable adjusting before it works perfectly.

The heddle must be hung so as to allow a wide shed. Sometimes threads have to be retied, as one loose thread destroys the perfection of the web. The shed is formed by pressing the foot on one treadle, and in order to keep the weaving even, a long lease stick is slid in the space across the loom. The shed is changed by pressing down the other treadle. (The treadles must be carefully adjusted so as not to strike the floor.)

It is well to begin the weaving with a heading of cord. The shuttle may be filled with twine or warp thread. This allows any defects in the threading of the loom to become very apparent.

When the shuttle is filled a shed is formed by pressing the foot on the right hand treadle, and the batten is pushed back toward the heddles with the left hand. The shuttle is thrown with the right hand as near as possible to the reed. The thread should not be pulled tight at the selvage. The row of weaving is then beat up toward the front of the loom by swinging the batten forward. The shed is then changed by pressing down the other treadle, and the shuttle is thrown through from the left



AN AMATEUR COVERLID WEAVER.

Setting up her first pattern from an old book of "drafts" found in a New Hampshire attic.

hand side. After about an inch of heading is completed it is easy to see if there are any threads to be corrected in the warp, and this may be done. If not, the weaving may be continued with whatever filling is desired. The photograph of Blind Tom weaving shows how the shed should look, and the shuttle ready to throw from right to left.

Many weavers nowadays use only new materials, long strips of denim, of figured chintz or outing flannel, producing fabrics of great beauty. But for those who prefer the method of the olden time it may not be amiss to give a description of how to use old materials. The great point is to have the rags cut evenly and to make them of a width to "beat up" to the same thickness in weaving—that is, a strip of muslin should be cut much wider than a strip of calico. Hit and miss rugs in soft colors are always useful in a bathroom. And if the filling material is old it will not fade any more.

The weight of the rug must be sufficient to hold it straight on the floor; two and one-half pounds of rags to the square yard is a good proportion—that is, five or six yards of denim or outing flannel. The rag strips should be

well sewed together. As the weaver becomes expert the ends may be overlapped without sewing if desired. The rug may be varied by introducing bands of color or by using two shuttles alternately, letting several colors run "hit-and-miss."

The beginner will have difficulty in taking out the work and it is much better to weave a series of pieces one after the other, leaving six inches of warp between, and weaving a cord heading at each end of each piece. The pieces when taken out should be finished with fringe made by tying the ends of warp.

The question of coloring materials often comes up. It is very easy to wind the balls of rags in skeins and dip the skeins in a dye both green, blue or brown. If the balls are of hit and miss this will give a shaded effect which is very good, and this method allows rugs to be woven to match the color scheme of certain rooms.

PATTERN WEAVING

After the amateur weaver has become proficient in making rag rugs or portieres it is interesting to try something more elaborate.



THE SAME WEAVER AFTER A YEAR'S TIME.
During which she had studied out five coverlid designs.

For pattern weaving harness may be increased by the addition of one, two or three heddles. The weaving of coverlids is an intricate process, but it can be successfully mastered by an amateur as is proven by these two photographs of a self-taught weaver in her summer home in New Hampshire.

Eliza Calvert Hall's Coverlid Book shows many lovely designs with their quaint names, "Governor's Garden," "Lee's Surrender," "Bachelor's Fancy," etc. It is interesting to note that when such weaving was in vogue it was taught to the prisoners in the State Prison of Auburn, N. Y., with great success, and many "prison coverlids" are still in use in northern New York. For those who need to start weaving with less strenuous work a small light loom is illustrated, especially recommended by physicians for the use of neurasthenics. It is well adapted for the weaving of "laid-in patterns."

The interest in hand weaving seems steadily on the increase. The desire for its beauty in our homes and the value of it in educational institutions has brought about a decided revival of this most significant craft. It has proven

valuable in institutions for the deaf and dumb, and the State Hospitals for the Insane. Very elaborate and beautiful pattern weaving is being done in the Lighthouse, the School for the Blind, in New York City, and at Devereux Mansion, Marblehead, Massachusetts. For those beginning weaving who feel themselves unable to cope with the problems of setting up a loom and putting on the warp, it may be interesting to note that excellent light-weight looms may be bought ready threaded at Devereux Mansion, Marblehead, Massachusetts.



A LIGHT WEIGHT LOOM

Recommended by physicians for the use of convalescents. It is especially good for weaving bags, hat-bands, etc.

CHAPTER V

BOOKBINDING

A lucrative craft which may be carried on individually, or coöperatively as in schools for cripples in Scandinavia.

a. Albums, portfolios, guest books, etc.

Apparatus needed, and steps in working.

Illustrations of processes and appliances.

b. Rebinding old books.

A special industry in itself.

Methods of procedure.

Illustrations of sewing frame, press, etc., and various processes employed in covering a full-bound book.

V

BOOKBINDING

THOSE wonderful volumes owned by Kings and Ecclesiastical Potentates, requiring months of patient labor, may be paralleled to-day by workers who have the triple requisites of money, time, and strength. Great libraries are still in existence which demand this exquisite craftsmanship in new work and in the repairing and preserving of precious volumes. There is no better field for the worker who loves intricate and laborious crafts.

But there is also an opportunity for the craftsman who has less capital and less strength, in the binding of music, the rebinding of old books by hand, and the making of albums and guest books. Such work is interesting and can be done at home, it is well paid, and affords great scope for exquisite delicacy of workmanship.

When it is done on a large scale, as in Scandinavia, where it is a feature of the schools for cripples, it is an excellent coöperative industry.

In such a case, large presses, "guillotines" to cut the edges of sheets, and other machines are required, and frequently printing and book-binding are combined so that large contracts—as for example, government reports in Denmark—can be executed.

The directions given are for individual work, and the list of tools and materials is kept as simple and inexpensive as possible, but it is safe to say that work done on a larger scale would stand a fair show of success.

ALBUMS, PORTFOLIOS AND GUEST BOOKS

The question of color harmony enters so largely into our furnishings to-day that we are often impelled to try to manufacture in the home workshop articles of daily use which we have failed to procure ready made. Fitness of material is also an important part of this problem of making a room harmoniously beautiful, and this applies even to the bindings of the books, which in a general living room should share the character of the rest of the

furniture. In a library there may be scope for elaborate and fanciful bindings, but books like guest books and albums which are used in a living room should be not only durable but simple and sturdy in effect. Albums especially should be built to endure the hard knocks of family life, for in these days of kodaks they hold the record of many a holiday and are frequently referred to. For this reason home-made albums are preferable, for each of the parts may be chosen for some special quality: strong hand-made paper of a dull gray or brown for the leaves, cowhide or sheepskin for the cover, and the coloring of the whole selected with a thought as to the style of photographic paper the family kodak fiend affects, a brown color scheme for sepia prints, blue-gray with gray-brown covers for black and white. If more vivid color is desired there is a certain leather prepared with vegetable dye called Niger Morocco, to be had in a dull red which deepens with age.

The making of an album is a task which requires no great skill, although patience and accuracy are essential. Let the would-be binder investigate the family workshop and see

that he has in hand the following: a hard pencil; a ruler with a metal edge; two pairs of dividers, both large and small; a carpenter's try square; an awl; a large paste brush; a glue pot and brush; a couple of good smooth boards. There are also necessary some drawing instruments, a T-square and triangles, and a few special book-binder's tools, an ivory paper knife, called technically a bone folder, a paring knife for leather, a small letter press, a finishing press, backing boards and a backing hammer. This small outfit, although it seems to contain so many articles, may be bought for a few dollars. For more advanced work a sewing frame is also essential.

In the way of materials, a few sheets must be procured of bookboards of various styles, strawboard, a finer style for delicate work, and a few sheets of paper of the desired color. Half a dozen sheets of charcoal paper make a good-sized album. Two sheets of a mottled paper called Morris or Oxford make pretty end papers, and the coloring may harmonize with that of the leaves. A quantity of cheap unprinted newspaper sheets should be kept on hand to cover delicate work; there should also

be at least two sets of smooth tins and a yard of coarse book linen.

The album is best made with flexible covers, and should be made all in one section, that is, one set of leaves folded one inside another. Six sheets of paper will be ample.

Take one sheet and lay it out on a large flat board. Divide the left edge into three equal



FOLDING SHEETS FOR ALBUM.

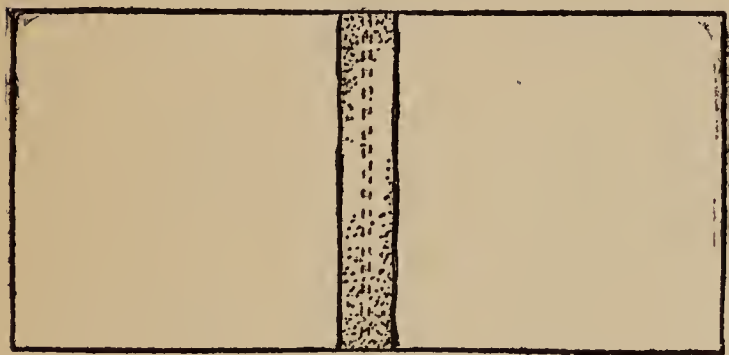
parts and draw lines across at right angles to the left edge. Find the center of the top edge and draw a line down *exactly* at *right angles* to the cross lines. Mark corners with Xs as shown in the drawing. Cut the *cross lines* with a sharp knife held against the edge of a metal rule, and fold each piece very carefully on the up and down line, so that the upper edges *ex-*

actly coincide. Cut and fold each sheet in the same way. This gives eighteen sheets, two of which may be made into end papers. Cut a piece of Morris paper the size of each of the two sheets. Lay them figured side down on a clean sheet of paper. Dip a large paste brush into flour paste which has been strained smooth, and cover every part of the paper, holding it in the center with the thumb and fore-finger. Lay the charcoal paper on the Morris paper, lay a clean paper over and rub down with the bone folder. Do each end paper the same way, and put them to press between tins covered with clean papers.

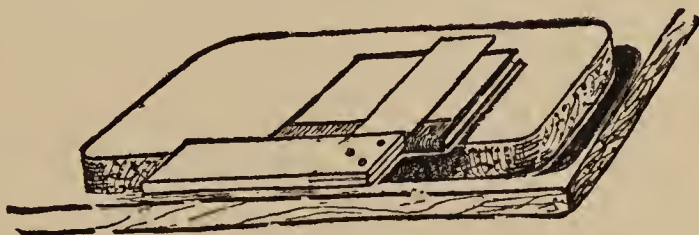
When they are perfectly dry take out of the press and fold, figured side in. Rub down the creases with the bone folder. Cut a piece of book linen one and one-half inches wide and the length of the fold just made. Paste this and lay the two end papers on it about one-sixteenth of an inch apart. Press till dry, and fold around the other sheets, with the book linen out, as it will come between the book and the cover. Press the book thoroughly, and *knock it up*, holding it between the two hands and tapping the *head* or top on a horizontal

surface. Next place the book on a stone and lay a try square across the head as shown in the sketch, being careful that the try square is exactly perpendicular to the back of the book.

This is all the cutting of edges necessary in an album, so the next step, after the book has



END PAPER WITH LINEN.



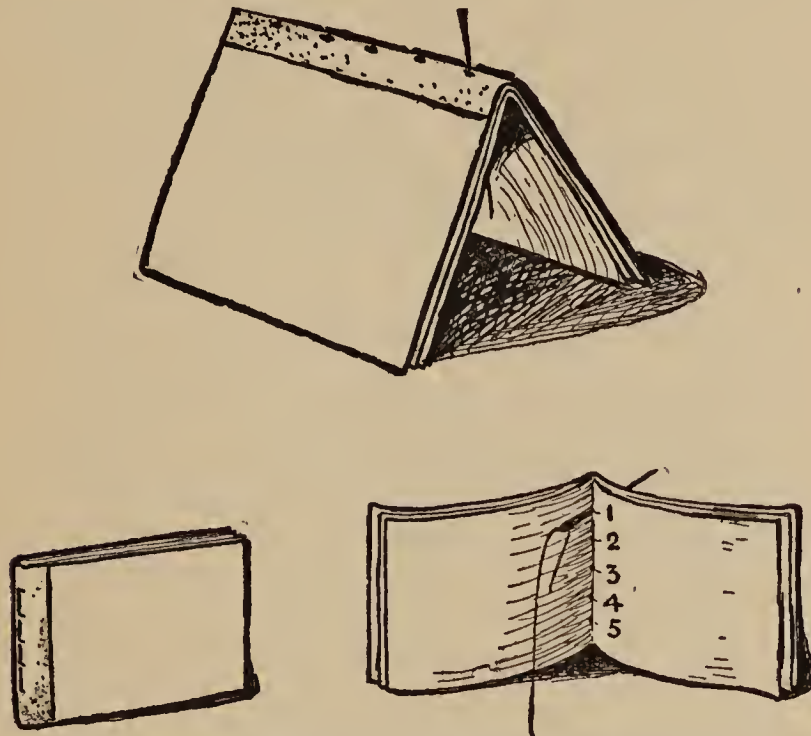
CUTTING HEAD OR TOP OF BOOK.

been well pressed, is sewing. This should be done with embroidery silk, of a color to blend with the book, or contrast with it. Orange silk is effective in a brown album. The stitches should be an inch apart, and holes should be pricked through pencil marks laid off with a rule before any stitches are taken. Begin in-

side, leaving a thread an inch long. The stitches go over and under, from top to bottom, returning in the same holes with an effect like back-stitching. When the top has been reached tie the ends of silk in a flat knot, cut about two inches long and fray out the ends.

A flexible cover is suitable for an album, but it is necessary to have inside the cover a light book board to make the leather lie flat. The boards should be the exact size of the leaves and pasted to the end papers, with paste in which a little glue has been stirred. Tins should then be placed between the end papers and the first sheet of the book, and the book put in press. To make the pattern for the leather, which should be made to project one-half inch beyond the leaves of the book, place the book, back down, on a large piece of manilla paper and draw around the back, then tip the book to the right side and draw around it; same with the left. Remove the book and correct these lines with the ruler, and draw another set one-half inch outside these. The leather may then be cut by this pattern, the lines being drawn on the wrong side to correspond with those of the pattern. The leather should be pasted in

place, the paste being applied to the boards and back of the book, and the leather quickly folded in place. Clean paper should then be laid over, and the bone folder used to rub down the back and sides until every particle of leather is stuck.

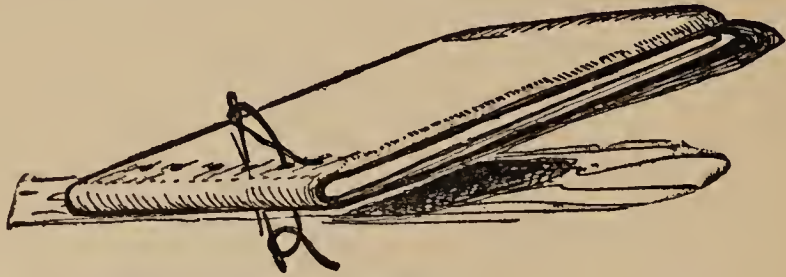


PRICKING HOLES. METHOD OF SEWING.

The book may then be put under slight pressure till dry.

The last step is lacing the back with thongs. Holes should be made with an awl about one inch apart, and the thongs of leather run through in cobbler's stitch as shown in the sketch; the ends being tied in the middle.

A guest book is almost as simple of construction, except that it should be made of several sections of any desired size, and sewed on tapes to allow of free opening. Charcoal paper and smooth, thin water color paper are both good



COBBLER'S STITCH. COMPLETED ALBUM.

materials and, if the paper is folded twice, that is, cut in half and each half cut in half, a good size is obtained. Each section should be prepared as described above and the end papers made and lined as in the album; but each end paper should have, instead of a piece of book

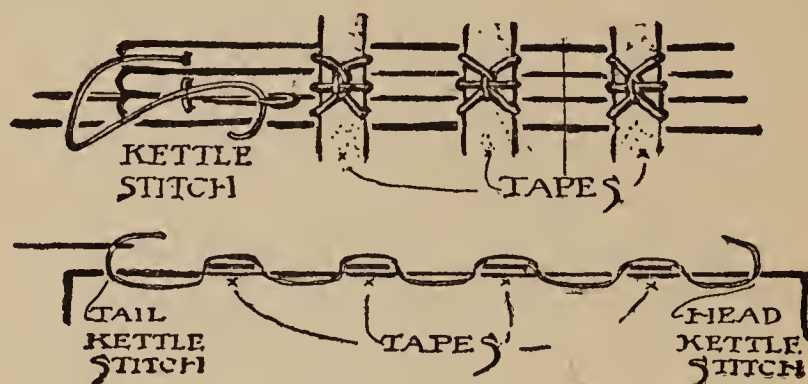
linen, a guard of thin strong paper wide enough to fold one over the first section and the other over the last section. These being put in position the book must be carefully *knocked up* and put in press between boards as shown in the sketch, with the *head* and *back* vertical. It should be under heavy pressure over night. A better style of end paper, too elaborate to be described here, may be found in Douglas Cockerell's book on Binding.



BOOK IN PRESS.

In sewing a book there are certain stitches called *kettle stitches*, taken about half an inch apart from each end, and lines must be drawn for these with the try square exactly perpendicular. Then the space between may be divided up in tapes, five equal spaces if four tapes are to be used. Lines must be drawn across with a soft pencil, and on each side of each of these another heavy line half the width of the tape away. These lines should all be

made very distinct, and it is well to saw in the lines for the kettle stitch with a back saw, about one-sixteenth of an inch. The other marks should be pricked through in each section. The sewing always begins with the end paper, and a long thread of embroidery silk should be used, with the end tied to a tack in the table, so that it will not pull through into the book. The



thread goes through the right-hand *kettle stitch* hole, through the end paper and first section and comes out of the hole at the right side of the first tape, crossing the tape and going in at the other side, and so on till the last hole is reached, when the second section is laid on the first and the thread goes into the hole just above, as shown in the sketches. Every three or four sections a buttonhole stitch is made catching the threads in each tape. The ends of the

thread must be tied with a weaver's knot. The sewing complete, the last thread is secured with a triple *kettle stitch*, and the first end untied and secured in the same way.

Rounding is an important process, as it gives shape and style to the volume. The back of the book should be soaked with glue, which is allowed to nearly dry, the book is placed on a table, and the top pressed forward with the

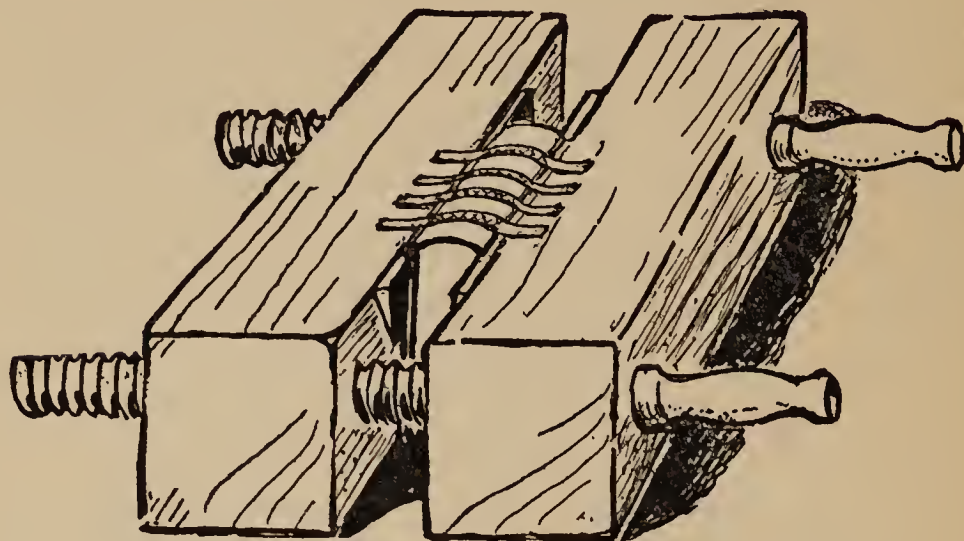


BACKING.

palm of the hand. The back is then tapped with a backing hammer. The book is then reversed, and the other side of the back rounded.

Backing makes the rounding perfectly solid. To back the book it must be put in a press, with the *backing irons* placed the thickness of the boards below the edge, as shown in the sketch. The edges are tapped with the backing hammer so they form a joint the thickness

of the coverboard, as shown in the end view. The whole back is then tapped until it is solid, a strong wrist blow being used.



BACKING—BOOK IN PRESS.

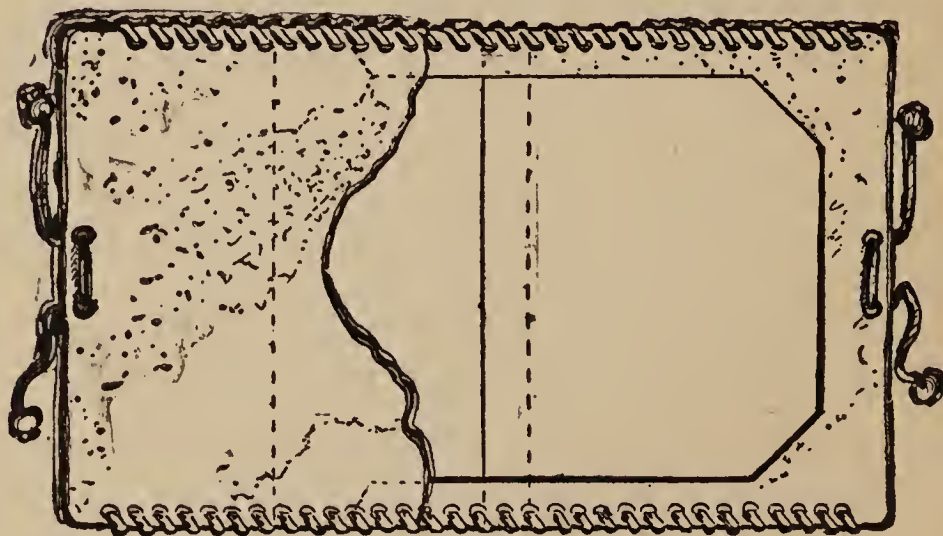
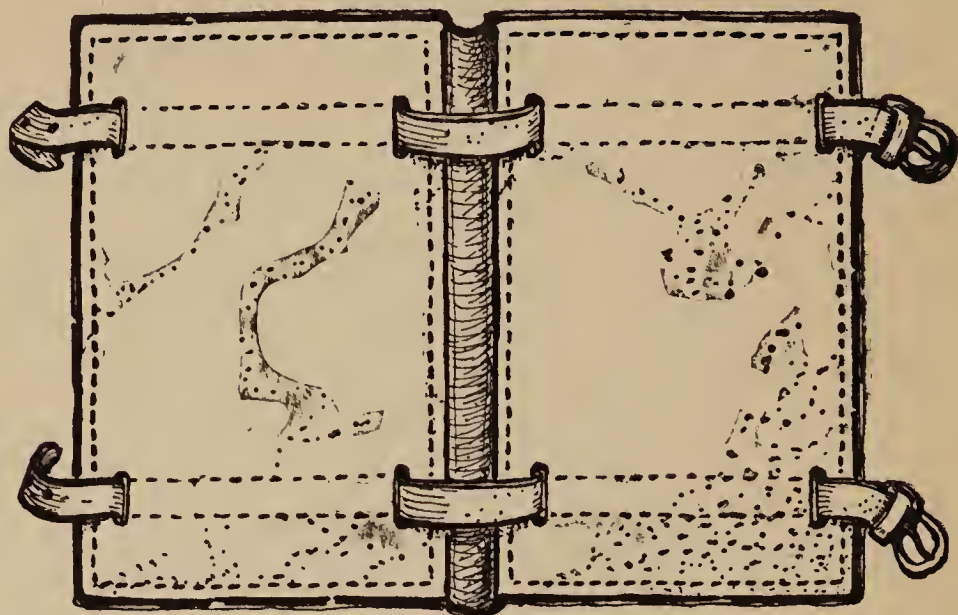
The book must be allowed to dry, and thin boards may then be pasted on, with $\frac{1}{8}$ of an inch of space between the joint and the board. These should be glued in place as in the album, and if the tapes are thin, they may be glued to the boards and the leather put directly over, but generally an extra paper or thin board is necessary. The leather cover may then be put on with projecting edges as in the album.

A word on the subject of portfolios may not come amiss. The size and proportion being decided, the number of pockets should be con-

sidered. A very practical style is made of a whole calfskin, the pockets being formed inside the covers, by folding the skin, as shown in the sketch, and the top and bottom being laced with thongs, which also form ends to tie at the front. The center of the back should be stiffened by putting on an extra piece of leather extending inside the pocket. The opposite side should be cut away so as to form a writing pad in which blotting paper may be inserted. Another portfolio is intended especially to hold sketches, which are often too long to go in the pockets of the ordinary size. It is made of calf or sheepskin, lined with a thinner leather, the two parts sewed together all around with *cobbler's stitch*, shown in a cut. An extra piece of thicker leather stiffens the back. When the sewing is completed slits are cut with a sharp knife through which leather straps are run, forming on the inside the equivalent of a pocket for long narrow sketches which may be slipped inside the strap. If desired, the latter may be finished with buckles.

Blank books, with perforated pages to be removed at convenience, telephone books, almanac pads and many other small articles may

be made with the tools used in book-binding. The tools referred to in this paper are com-



PORTFOLIO—VIEWS OF OUTSIDE AND INSIDE.

paratively inexpensive—leather is usually dear if of good quality, but need only be bought as

required. It is, however, much easier to manipulate than any form of cover paper, book-linen or other substitute.

A short description follows of

THE REBINDING OF OLD BOOKS

Most of the books nowadays are not bound at all, they are merely cased, and that in such a way that the covers pull off after a little wear and the leaves are injured by deep saw cuts, or wire threads holding the sections. But as often these poorly bound books are printed on good paper, or have some association which makes them worthy of preservation the rebinding of them is worth considering, and is often developed into a lucrative craft. This is especially true in small towns, where the public library may give an opportunity for keeping books in repair. Binding music and rebinding old music books are also remunerative.

If an old book is to be rebound it should be looked over carefully to see that no pages are missing, and any torn places should be mended as described in the paragraph on mending. Each sheet should then be registered, that is, held to the light to see if the printing on the

upper right corner of the first page coincides with that on the third, if not, it should be refolded so that it does, and the new crease rubbed down on glass with a bone folder. Each sheet should be corrected and put in its place, so that the pages read correctly. The next step is to cut the top, commonly called by binders the "head," the bottom being called the "tail" and the front the "fore-edge." Probably you may have observed that in many books the margins are unequal in different sheets. It is a distinct improvement to cut them so that every head-space corresponds. To do this, a pair of dividers must be very carefully set to the distance from the top of the printing to the top of the paper in the sheet which seems to be the shortest. Generally a section of eight leaves can be taken at once. Two little marks are made with the dividers, and a try-square is laid across these, the handle-side resting against the back of the book. The upper edge of the try-square is then followed along with a sharp knife, a potato-knife or pen-knife will answer, on a piece of glass. Each section should be cut in this way, or if the sheets seem fairly uni-

form, possibly it may be enough to cut each section. This provides a "head" which is exact enough to be used in "knocking up" the book. This is done by holding it so it is vertical, head down, between the palms of the two hands, and knocking it against a perfectly horizontal surface, a piece of glass or a paring-stone. Knocking up is a very important process and must be repeated at nearly every stage in the work.

End papers, or what are sometimes called the "fly-leaves" of a book, are important and should always be of paper similar to that of the book, and used so the grain of the paper runs lengthwise. With a large steel square, get a square corner, measuring from this four sheets one-half inch longer and one inch wider than an open sheet of the book. Mark each of the four corners with a cross, and cut the edges with a knife, along the lines formed by the square. Paste an inch wide strip of book linen on to form a "tip" or guard as in the guest book, but unlined.

When the end papers are made and laid in the position on the ends of the book, tip out, with the corner marked X at the top, the book

is ready to be put in press. After the "head" is cut by hand, the "fore-edge" and "tail" or bottom may also be cut by hand, but it is a tiresome process, and can be done better on a cutting machine in a bindery.

For pressing a letter-press answers very well, if the book is left in long enough, say forty-eight hours. The book must be knocked up at the head and back with great care, and laid on the center of a board. It must be tested with a try-square. If it stands vertical, place another board on top and put it exactly under the screw of the press. Test it to see that it has not slipped, as, if the sheets are pressed in a wrong position the defect cannot be remedied. The press should be screwed as tight as possible. Several books may be pressed at one time if care is taken in putting in and removing them, with boards between.

When the book is pressed, the next step is sewing. Knock up the book and divide the back with dividers if it is to be sewed on four tapes, into five parts, the one at the "tail" being a little the longest. At each end, mark a point one-half inch in for the *kettle stitch*. Draw lines across the book with a soft pencil,

using a try-square, one for each kettle stitch, and one for the center of each tape. On the bottom of the sewing frame, which is shown in a photographic illustration, measure corresponding distances for the four tapes and tack each one in place, then carry each one to the top of the frame and pin it over the ring. Place the book in position and test with a try-square to see that the tapes and marks on the book are vertical. Screw up the rings.

The book should be sewed with medium sized book-binder's thread, or with embroidery silk, a soft green being satisfactory. The needles should be large. In very careful work a hole is pricked for every stitch in each section. Tie the end of the thread to a tack at the right of the book, and begin sewing the end paper, starting in at the outside of the first kettle stitch. If it is necessary to make a knot, it should come between the tapes; the best way being to attach the new thread with a weaver's knot, pulling the knot through so it comes on the inside of the book.

In sewing tapes, it is well to catch every third thread with a button-hole stitch. The sewer may sit in front of the frame, as in the

photograph, or at the end, but her position must always be such as to allow her left hand to go behind the tapes, in the middle of the sections she is sewing on. When the sewing is finished the ends should be fastened with a double kettle stitch and each thread put through into the book, cut off about three-quarters inch long, and frayed out like a tassel so it will be flat. The tapes may then be cut off two inches from the book, and the book taken out. It should be put in the finishing press, back up, and the tapes pulled very tight.

All the processes between sewing and finishing are included under the general name of *forwarding*. The first of these is *gluing up*. The book is first placed between mill boards having one right angle at the corner formed by head and back, and carefully knocked up. It is then put into the finishing press, back up, and the back daubed with hot glue. Book-binder's glue is the best.

The next two processes, rounding and backing, have already been described. If the book is a valuable one, great care should be taken to put it in the press just right and to use regular "backing irons" so as to force a



USE OF SEWING FRAME. (Sewing on Tapes.)

joint into which the covers will fit. The book should be put between the backing irons which are set in the press, ends of tapes out, in such a position that the exact thickness of the boards projects above the top of the irons to form a "joint." If necessary, lines may be drawn to mark the exact place for the top of the irons. Even professionals have frequently to put the book in position two or three times to get it exact. Back as described in the beginning of the chapter.

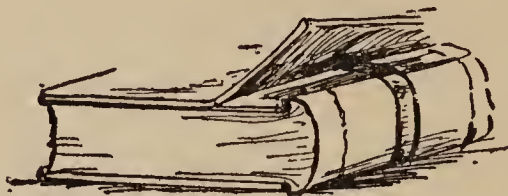
The book may then be left in press to dry, the process of backing being completed, while the boards are made. In a book sewed on raised bands the best quality of mill board should be used, lined with good white paper. For a book sewed on tapes, the thin mill board may be lined with straw board. The approximate size, considerable allowance being made for cutting, should be decided on, and the four pieces of board cut.

After the long edges are cut a line should be drawn two inches in on each board, and the straw board glued to the mill board outside this two-inch space, which should be filled in with a loose piece of paper. After the boards

are prepared in this way they should be nipped up in the press.

The two sets of boards should then be stuck together with a bit of paste, the cut edges exactly coinciding and the mill boards outside. They should be put in press over-night.

The boards should then be cut to fit the book, allowing $\frac{1}{4}$ inch the thickness of the board longer than the book, and $\frac{1}{8}$ wider. In setting the boards in place, an allowance of perhaps one-sixteenth inch should be left to allow the boards free play. The ends of the tapes



PASTING TAPES AND TIP INTO COVER.

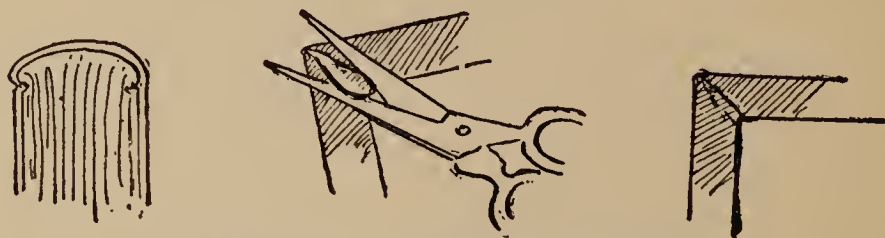
and the tip should be cut parallel with the back one and three-quarters inches away. These ends and the tip should then be slipped into the two-inch space left between the boards, the paper being first removed. If they fit correctly they should then be glued in, the book being protected by a paper cover. The boards must be tested for accuracy before the glue sets, and the book nipped up in the press.

In full bound books the entire cover is of leather; in half bindings, leather is only used for the corners and backs. A pattern for a full-bound should first be drawn carefully with T-square and triangles, allowing three-quarter inch extra for turn in. The leather has the pattern drawn on it to coincide, and the three-quarter inch edge is then pared thin, the very edge being as thin as possible. The space over the back is also pared a little, not very much in books sewed on tapes. It will pay to learn how to use a paring-knife by watching some one in a bindery, as it is hard to describe the process in words.

The back of the book should be filled in with paper between the tapes and sand-papered smooth. A little paste may be put on before the leather is put on. The leather should be well soaked with paste, and spread out wrong side up on a stone. The back of the book is laid on the middle of the leather, and the book turned over again for the other side. Then the leather is pulled into position if the margins are not equal. The book is then stood on the fore-edges and the leather pulled down with the palms of the hands, as shown in the

photograph, and patted flat all over one side, then over the other. The fore-edge is then worked by pulling the leather over, lapping it inside and rubbing the edge with the bone folder, the other fore-edge the same way, as shown in photograph.

The book is then stood up on one end and the leather pushed away from the top far enough to allow a space to make it lap down neatly across the back—that is, it must be



HEAD CAP. MITERING CORNERS.

“tucked in” between the boards and the back. The very middle must be pulled up a little so as to make a head-cap. After each end is done this way, and the edges turned in along the boards at head and tail to the corners, a long piece of silk is tied around the book twice, pulling in the leather. The cap is then formed by tapping the book, tipped slightly backward on a stone, and pressing a small orange-wood stick into each side of the cap to hold it in shape.



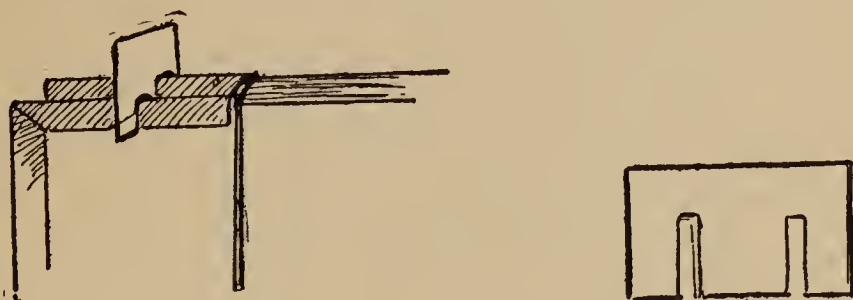
COVERING A FULL-BOUND BOOK.

The little sketch shows the correct form. The silk may be left on while the corners are being mitered. The inside corner is made by stretching the leather diagonally onto the book, the surplus leather is then pushed up and cut away



ONE SIDE DRYING.

with scissors, leaving a tiny overlap, to be pasted down very carefully, covered with fresh pieces of paper. The joint especially must be perfectly smooth. When one side is



FINISHING CORNERS.

done it should be left open and folded back in canton flannel under a board or stone while the other side is done. The book should then be left open standing, with the covers held back by a piece of cardboard cut as in the picture.

The paste used in the different processes may be obtained from a bindery or made at home. If the latter it must be rubbed very smooth with a spoon through a fine sieve after the materials are wet.

For leather the following proportions will make a good paste: two cups flour, eight cups hot water, a few drops oil of cloves. Stir constantly, while boiling. For paper, especially in mending, a paste made of starch is preferable. One-half flour and one-half starch is a good proportion. A little formaldehyde may be used to make it keep.

In mending, the essential thing is to have plenty of clean papers with which to rub down the work, so that the fingers need never touch the partly dried patch. Each mended sheet should then be laid under a stone, between clean papers. The thinnest Japanese paper, if strong, may be used. It should be measured with dividers and cut with a sharp knife and glass. Often single sheets are pasted to the last leaves of sections. These should be moistened and removed, and *guarded*; that is, a strip of paper heavy enough to hold sewing should be cut just the length of the sheet and

wide enough to fold over and sew with the section. Engravings and maps may be mounted this way. In the most delicate mending the edges of the paper are sometimes pared, and often a piece like the page is used. The mending-paper should always match the book in color. In making new end papers for old books the paper chosen should be deeper, rather than lighter in color. Novels, school-books and other cheaply cased books often have their covers pulled loose while the leaves are still solid.

In order to repair such a book, pull the cover off altogether; if the end section is loose overcast it to the book with a piece of fine bookbinders' thread, then take two pieces of mill board as near as possible to the thickness of the boards, place one on each side so as to hold the joints perfectly in place, and put in the press over night. If the end papers are very much worn, new ones may be attached before the book is pressed.

When the book is well pressed the cover may be replaced. A method often used in repair-shops is to take a piece of coarse-meshed linen about an inch wider than the back of the book

and a little shorter and glue it on, leaving an inch flap at each side. When the back is dry these flaps may be pasted to the covers, and when they in turn are dry, a sheet of the end paper may be cut to fit and pasted over like a filling-in paper.

CHAPTER VI

CEMENT WORKING

Use of concrete materials for small objects, such as flower pots, bird baths, stepping stones, etc.

Success of experiments at Devereux Mansion in mould making, and in the use of color in tiles, etc.

Application of craft to coöperative work-shops in hospitals and sanatoria and to individual handicapped workers.

Preparation of cement, necessary appliances, and description of processes employed.

Illustrations of steps in making a cement flower pot.

VI

CEMENT WORKING

ABOUT ten years ago in searching for suitable occupations for the handicapped Dr. Hall and one of his assistants, Miss Edith Griffin, a skilled designer, hit upon the idea of using concrete materials for the making of small objects such as flower pots, bird baths, and the like. At the time the field was practically new. There were no suitable moulds in existence. The principle, of course, was well enough known and well applied in large *architectural work*. It became necessary to undertake a long series of experiments in order to produce small moulds which would work satisfactorily and with little danger of disappointing results. The better part of two years was devoted by Miss Griffin and her assistants to the task of designing such moulds and the more difficult problem of getting them cast satisfactorily in

iron. Finally, however, a group of a dozen very attractive flower pot moulds was evolved. The materials and the moulds are not very heavy; the operations may be done with comparatively little outlay of strength and the results are most satisfactory.

The flower pot making as it has been carried out at Devereux Mansion in Marblehead and in a number of hospital workshops elsewhere has developed unexpected value as an emergency occupation for people who would otherwise be idle. All classes of workers find interest and pleasure in making the flower pots. There is apparently a steady market for well designed and well executed concrete work for in-door and garden decoration. The flower pots have been found to be of special value to florists and plant growers everywhere. The thick walls of the pots are somewhat porous; they take up considerable quantities of water and hold it for a long time, keeping the earth moist and serving the plant in a very satisfactory way, much better than the ordinary terracotta flower pot which is waterproof and which easily drowns the roots if the accompanying saucer is kept filled with water. With these

new pots it is not necessary to water often because of the extra moisture retained. It is believed that infrequent watering is a distinct advantage to the plant, approximating conditions of nature which gives but infrequent showers. However that may be, it has been possible to restore badly drooped and very unpromising plants by the use of these new flower pots. The old-fashioned flower pot is cheaper, no doubt, but a considerable public is willing to pay for the interest and adaptability of the new ware. New possibilities are continually suggesting themselves along this line. It is evident that only a beginning has been made. Now that it is possible to produce satisfactory moulds, it is only a question of time when designers will give us forms and decorations which will put the new ware upon a firm basis of artistic and technical value.

The new flower pots represent only one small field of possible work with cement. All over the country there is a growing interest in attracting birds and in making conditions favorable for their continued stay, consequently the bird bath has become a very common and desirable adjunct to the garden. There is no

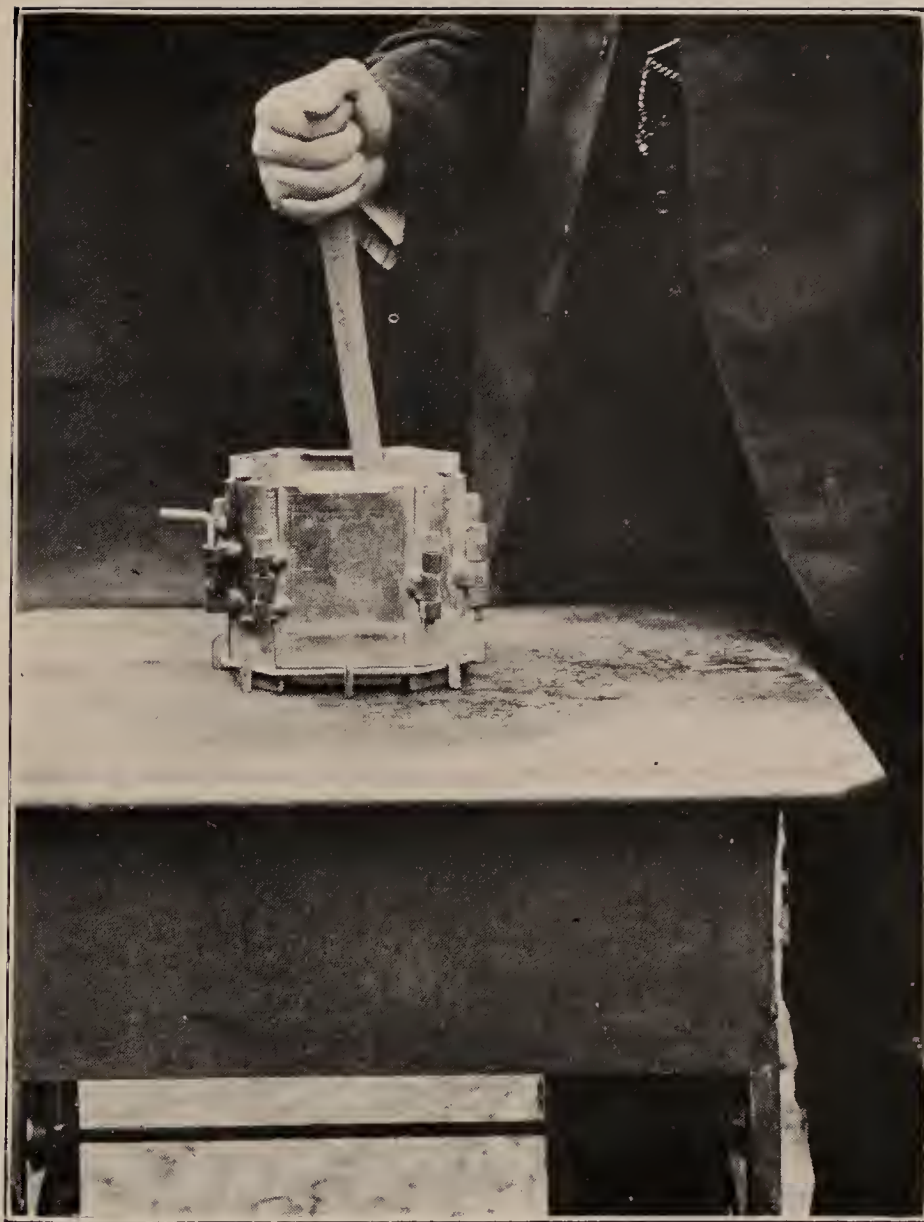
end to the possibilities of shape and decoration and arrangement. The making of moulds for bird baths is a very simple process and commonly the amount of material used does not mean heavy lifting for the worker. Garden seats of cement are now used very generally. They are practically weather proof and may be made most attractive. Stepping stones of concrete are a most interesting and useful product. At Marblehead a series of experiments is now under way which seems likely to produce attractive and inexpensive mosaic tiles in color, for fireplaces, vestibules, floors, and garden walls.

This kind of work may be done on a large scale in special workshops or it may be done at home by single workers provided with inexpensive equipment. All in all, cement working is one of the most easily available and practical fields of work for the handicapped. The worker need not be a designer, because the moulds if properly made will determine the design for him. On the other hand, if he has ingenuity and taste he may devise moulds for himself which will be productive of good results. The materials used are very cheap and

the products have a value sufficient to make the work reasonably remunerative.

The beginner, in undertaking cement work of the kind which has been suggested and used so successfully as a handicapped occupation, should secure for himself to start with a few iron moulds, a little trowel such as is used by professional moulders in the foundries, a good sized mixing spoon, and some ordinary agate ware basins of good size. From a dealer in masons' supplies he should purchase a bag of Portland cement and a few bags of medium fine building sand. We use at Marblehead, Atlas Portland cement; almost any good brand will do. The sand must be sharp; that is, it must not be so fine or so water-worn that it has not sharp cutting edges, and it must be free or nearly free from loam or clay. Any practical builder or dealer in supplies will pass judgment on the materials. There will be need of some half dozen primary metallic colors: these can be obtained from Waldo Bros., 45 Batterymarch Street, Boston, and from B. F. Drakenfeld & Co., 50 Murray Street, New York City, in the crude primary shades; and in several interesting blends of soft and pleasing

tones at Devereux Mansion Shops, Marblehead, Mass. To make a flower pot it is necessary to mix the cement and sand dry, adding a little coloring matter of one sort or another as desired. These materials are thoroughly mixed together with a spoon in the proportion of one part cement and two of sand; the amount of each ingredient will be best determined by experience, as it varies, of course, with the size of the mould. When the mass is mixed a small quantity of water is added, a teaspoonful at a time and stirred in. This added water is taken up by the cement which after a few hours will harden. If the mixture is too wet, it will stick to the mould; if it is too dry, it will crumble and be unsatisfactory. Only experience can teach the exact degree of moisture which is best. A good test is made by taking a handful of the moist mixture and squeezing it with the fingers; there should be no excess of water, but the mass should adhere together showing the imprint of the fingers. This little handful which is held together by its own cohesion should be easily broken apart, leaving a fairly straight line of cleavage. Generally speaking, about a half cupful of



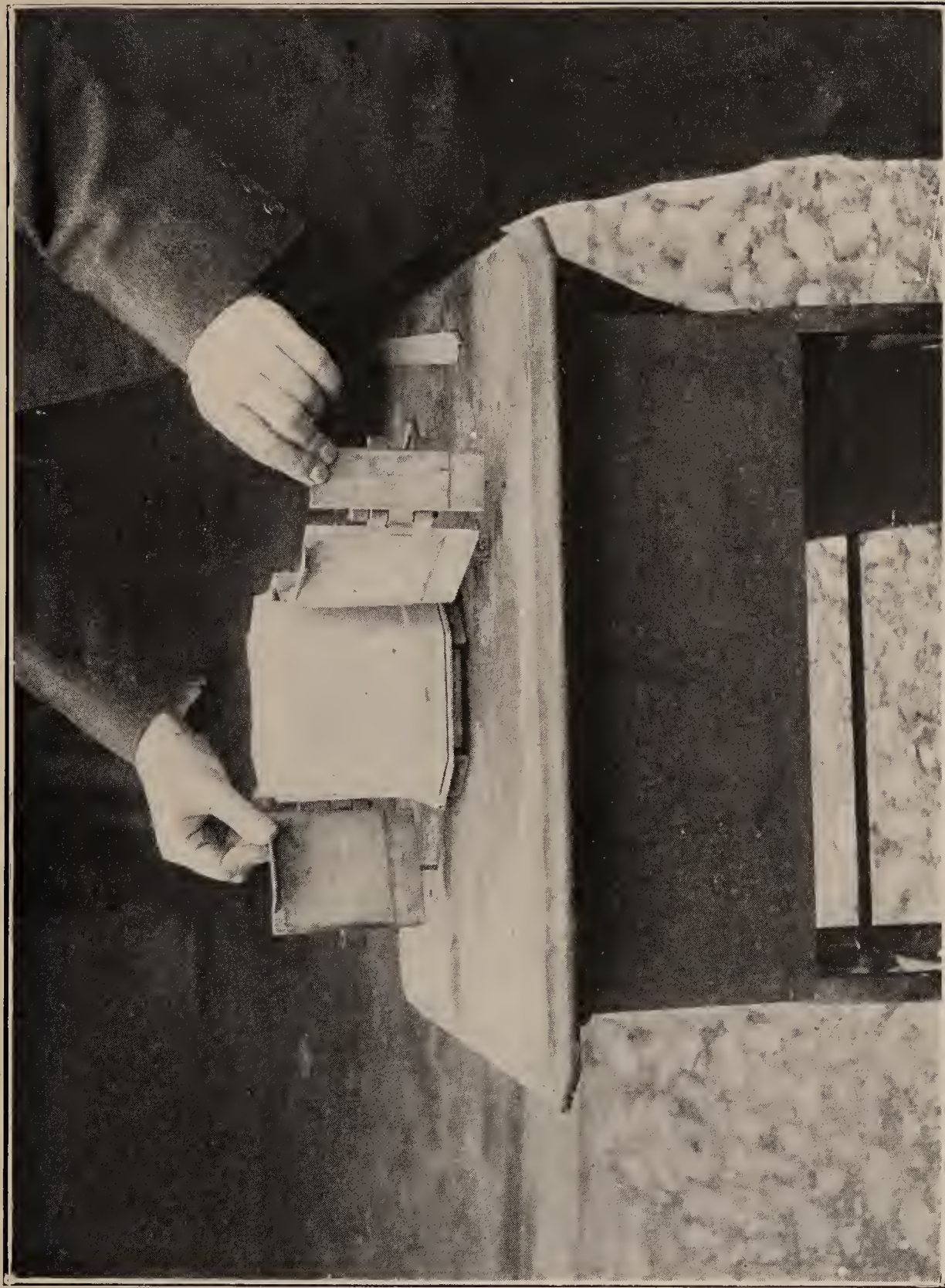
CEMENT WORK, 1.
The mould closed, showing method of tamping.

water to a mixture for the ordinary sized flower pot is sufficient. The usual mould consists of three parts: the carrier, which is a little hollow square made of brass; the core, which is of smooth iron and over which the carrier sets (this core is a solid shape of metal which fills the space later to become the inside of the flower pot); finally, the mould proper, hinged together in such a way as to fit around the carrier, leaving a space for the cement between the wall of the mould and the core. A glance at the accompanying sketch will show how these parts are assembled. The pots are always made upside down so that they may be lifted off the core without difficulty. When the mixture is ready the mould, the core, and the carrier should be brushed over with kerosene. A small paint brush is best to use for this. It is necessary to cover all parts of the inside mould, the core, and the carrier so that the cement will not stick later to the surface of the metal.

The tamping or pressing down of the moist mixture into the mould is a simple process and yet it must be done with some care. A good handful of the mixture is thrown into the

mould so that it will fall between the core and the sides. With a stick made of ordinary hard wood and having about the dimensions of a foot rule, only a little thicker, the mixture is pounded or tamped down hard. It is well to scratch the upper surface of the tamped cement with a pointed stick, so that the next handful when tamped will unite with the one before. This process goes on until the open top of the mould is reached. It is then well to pile up the mixture an inch or so above the level of the mould and to press it down hard by striking with a mallet over a smooth board. The last layer, which will form the bottom of the flower pot, must be smoothed off carefully with a trowel or straight edged stick; otherwise the pot will set unevenly. It often happens in taking off the mould that some corner or small section of the flower pot will crumble and fall off. If this broken place is not too large, it can be easily mended by patching a little of the mixture into the defect in much the way a dentist fills a tooth.

When the cement is tamped in, the walls of the mould will leave their impress on the mixture and the core will fill up the space which



CEMENT WORK, 2.

Opening the mould—showing flower pot upside down, core still in place inside.



will later become the inside of the flower pot. As soon as the tamping is finished, the sides of the mould are removed with great care to avoid breaking down the corners or the decoration. The finished flower pot is then lifted on its carrier, leaving the core behind on the table. The pot on its carrier is then placed somewhere out of danger of touch, and it must be kept moist for the first twenty-four hours while the cement is setting. Moisture may be provided by the use of little tents of wood covered with cloth. These tents, placed over the soft flower pot and kept moist with water will be very useful. After about twelve to twenty-four hours the flower pot will be hard enough to be lifted from the carrier. It may then be placed upon the ground or the floor or some suitable shelf where it must remain as nearly undisturbed as possible for at least two weeks, being kept moist all this time. It is then ready for use, although a longer hardening process will do no harm. After the first few days it is well to turn the pots over, right side up, and to fill or partly fill them with water. This insures a thorough soaking. So much stress is laid on wetting and keeping dry because if the pots

are allowed to dry, especially during the first few days, they will always be weak and crumbly.

The small iron moulds meet the requirements of a considerable field of cement work and the method is particularly useful for those whose physical strength is slight and whose nervous energy quickly gives out. They produce, however, only comparatively small pieces. Cement is a material well adapted for larger and heavier work. In making the larger pieces such as bay tree pots and the larger hollow ware for the garden, the so-called template process is more practical. To make one of these larger pieces the same mixture of sand, cement, and coloring matter is mixed, only in larger amount. The core, which is to represent the inside of the large pot, can be made of sheet metal, in plaster of Paris, or in moulder's sand which last may be fashioned into any shape after it is moistened. This core is fitted over a central shaft which protrudes well above the top of the core. The core naturally follows the lines which are to be the outside of the pot but need not follow exactly. This core should be made or fixed upon a solid table



CEMENT WORK, 3.

Lifting the completed flower pot from the core which is left behind on the table. The pot is still soft but is movable because it rests on the little frame of metal called the carrier.

and the central shaft must be screwed or bolted to the table firmly. Over the core may then be plastered or tamped a sufficient amount of the moist cement material to cover the whole surface an inch or two deep. The tamping is made easily practical by placing around the core a sheet metal apron or guard which will hold the material firmly while the tamping is going on. This sheet iron apron can be made by any tinsmith and it should be built in two parts so that when the tamping is done the metal may be easily removed from the mass. When the apron is removed, there will remain the core covered thickly and firmly with the tamped cement mixture, which is still soft enough to be scraped or moulded into shape. Through the middle of the whole structure protrudes the central shaft. The template or cutter, which is to shape the outside of the pot, is made of steel or iron cut to the exact lines that are required for the outside of the pot. It fits over the central shaft in such a way that it may be revolved about the piece, cutting slowly into the mass. It is adjusted so that the cutting edge shaves off a little at a time until the final shape is secured. If the mass is cut down

too rapidly, it breaks and falls to pieces. When the cutting is done, the template is removed and the piece is allowed to remain overnight or longer, resting on the core. The material is kept moist by the application of cloths applied in many thicknesses and soaked with water. Finally the core and its cement shell are turned over and the core removed. These larger pots, like the smaller pieces, must then be kept moist for a considerable period of time, two weeks or more, until the hardening process is complete. The hole in the bottom of the pot, left by the shaft, may be plugged with moist cement which will later harden.

A considerable variety of hollow cement work, bowls, and flower pots may be made from very simple plaster of Paris moulds. As is well known, plaster of Paris will harden into any shape to which it is applied. The designer can model in plasticene or clay any shape which does not narrow at the top and from this shape may be made a one piece mould which will later give form to the cement. It is possible to take any well shaped glass or pottery or metal dish and make from it a plaster of Paris mould which will reproduce an in-



A WATER GARDEN FOR THE BIRDS. CAN BE EASILY MADE OF
CONCRETE FROM A SIMPLE PLASTER OF PARIS MOULD.

definite number of cement pieces of the same shape. Take, for instance, the ordinary agate ware wash basin. Such a basin is turned upside down and plaster of Paris, mixed with water to the consistency of soft mud, is spread over the surface. When the plaster is hardened the wash basin is removed. It comes out easily if there are no irregularities and if the surface has been well oiled. The result is a heavy chunk of plaster of Paris containing the impression of the wash basin. Such a plaster mould must be thoroughly dried in a warm place. This drying process usually takes a week or more. When the mould is dry the smooth inner surface is covered with a coat of shellac. Immediately before use the mould must be painted over with linseed oil, then coated with a layer of thin gelatine solution. Into the hollow thus produced a sufficient amount of the moist cement mixture is pressed and smoothed, making a cement lining for the mould. This lining should be made fairly thick, as thick as the cement bowl is intended to be. The inner surface should be carefully smoothed and finished by hand. The mould and its cement lining may then be

covered with a wet cloth and left for twenty-four hours. When the mould is inverted and tapped lightly with a mallet, the cement shell will drop out and may be treated as the flower pots are usually treated; that is, set aside and kept moist for a sufficient length of time. Such bowls filled with earth and planted with nasturtiums or the like are exceedingly effective.

The making of solid cement pieces such as stepping stones and the tops of garden seats is a comparatively simple matter. The moulds are usually made of wood in such a way that the sides may be easily removed. There is, of course, no need of a core, so that the cement mixture is tamped in solidly. A very serviceable stepping stone for gardens is produced in this way. The stepping stone moulds which have been used very successfully in Marblehead are made of iron and fastened together with clamps at the corners. The iron frames are made ten and twelve inches square and two inches high, so that the finished "stone" will be thick and strong. The frames or moulds are assembled on a piece of smooth marble or heavy glass; the slab or glass must be oiled as

well as the sides of the frame. The open space is simply filled and tamped hard with the cement mixture. If the mixture is well tamped, the sides of the frame may be removed at once. The stepping stone may be moved by hand in about twenty-four hours if it is kept thoroughly wet. Meanwhile it requires the same wet conditions for a long period, two weeks at least before it is ready to use. These stepping stones set in the grass of the lawn are most effective. The grass grows around the sharp corners and soon gives the desirable irregular shape to the "stone." While the cement is still soft it is possible to impress upon its surface any simple design, thereby adding greatly to the interest of the piece.

Most interesting mosaic tiles are made in the following manner. On a sheet of wax or clay is made the deep beveled lines of any outline picture or design. The sheet of clay should be of the size of the proposed tile. Frames similar to the stepping stone frames or moulds are placed about the wax, and soft plaster of Paris poured into the space thus formed. When the frames and wax are removed, the design will be found transferred to the plaster of Paris.

Such a plaster block bearing a design in outline may be impressed upon a soft tile of cement. But the plaster soon breaks down and wears out, so it is much better to have the plaster of Paris design duplicated in brass or iron. Any first-class foundry will undertake the job, and the resulting die may be used indefinitely. When this die is pressed or hammered down into the soft surface of the cement tile, the lines of the design will be left, either raised or depressed as the case may be. If the lines are raised, it is easy to fill into the spaces of the design the colored cement inlays.

Of course, all this work with cement implies practice if the results are to be satisfactory. The beginner must not be discouraged with early mistakes and failures. It is a great deal better whenever possible to have a teacher who has been trained in the various processes. Yet such work might be taken up by any invalid with fair strength in the arms and with the assistance of some one accustomed to the use of cement for ordinary building purposes. At the workshops in Marblehead there are almost always young women learning to teach cement working. They find positions in hos-

pitals and asylums, or as attendants and teachers for individual invalids. A number of successful workshops have been instituted in various parts of the country. It has been the intention of the management of the Marblehead shop to equip with teachers and supplies workshops that shall be scattered over the country in such a way as to avoid competition. While the market for well made cement articles is perennial and good, it is limited; and no city would be likely to support successfully more than one shop.

CHAPTER VII

POTTERY MAKING

Pottery at Marblehead, established twelve years ago.

Started with idea of occupation for handicapped workers. Two principal workers served apprenticeship as patients. Work undertaken too general for a patients' work-shop. Should have been limited to one or two small specialties.

Finally given over to a professional industry, successful financially.

Pottery for tubercular girls near San Francisco, California, and for patients in State Hospitals of Massachusetts.

Possibilities of tile industry, and description of methods of working.

VII

POTTERY MAKING

POTTERY making is included in the list of occupations for the handicapped more because of the writer's belief in its possibilities than because of actual accomplishments and cash returns. Twelve years ago in Marblehead a small pottery was established with the idea of occupation for handicapped workers. The pottery is still in successful operation. It has not for a good many years been used as a school or in the interest of invalids, although two of its principal workers of to-day had their apprenticeship as patients twelve years ago. The reasons for giving up the teaching and the work for invalids will be of interest to any one contemplating pottery as a special occupation. The industry began with the employment of one man with technical training in the art. He was supplied with the necessary equipment

for a beginning and was advised to go ahead as though he were doing it for himself, without any reference to pupils or patients. There are a great many details in pottery making, and certain of these can be accomplished by intelligent assistants without special training. The attempt was made at Marblehead to produce a considerable variety of ware; and here probably was the first mistake. If the work had been kept down to one or two small specialties, it would have served better the interest of the invalid apprentices. But the man in charge was not content to go slowly; he had, in fact, too much the professional idea, and was too much an artist and creator to be a good teacher. The result was that the pupils could not keep up with him. They spoiled some of the work, and it was decided to go ahead for a while on a purely professional basis. So with the assistance of the two apprentices who have since become professional, the work was carried on and developed to a very high degree of perfection. Finally, it became so successful on the new basis, that it was allowed to go on so; and the idea of making a new industry for the handicapped was given up.

A pottery was established some years ago by Dr. Philip King Brown of San Francisco for the benefit of a tubercular sanatorium. It was intended to give the patients, who were young women from the department stores of San Francisco, a chance to earn their living while they were convalescing. Dr. Brown reports that while the work has been satisfactory as an occupation and while the patients have turned out a fair quality of ware, the institution is not successful financially because the product is not quite good enough to compete with existing commercial potteries; and because, as in the venture at Marblehead, the professional potter chosen to conduct the institution proved to be too active and ambitious for the best teaching results.

Pottery has been undertaken by three of the state asylums for the insane in Massachusetts. So far it has been used largely as a diversion and to add to the interest and permanent value of clay modeling. Recent exhibitions from these potteries have shown creditable work. They have not been in operation long enough to warrant any prediction of their commercial value. There is no doubt of the interest and

desirable diversion available for mental patients along this line.

After ten years' observation of a small but successful pottery plant, the writer feels justified in the following conclusions and predictions. Work in clay should not be undertaken by the handicapped except under the most careful and experienced direction. They should then undertake some specialty such as tiles or opaque shades for indirect light fixtures. Such products, which can be made in moulds and decorated by hand, have large possibilities of commercial success, and need not be too complex or difficult in execution. In the broader fields of pottery covering hollow and flat ware, competition is too keen and the technical difficulties too great to warrant any extensive manufacture. Another great objection lies in the difficulty of securing the right kind of instructors. There should be a fine field here for young art students who are willing to devote their lives to teaching without a consuming personal ambition. New York State University at Alfred has a school of pottery which could easily give the required technical training. A graduate of that school

might establish in connection with some institution a training school for teachers.

A small tile industry could easily be established in connection with an institution or by a few handicapped workers in any community. It is not necessary to have a native clay, although the existence of suitable earth in the near vicinity lessens the expense of manufacture. Decorated tiles suitable for fireplaces can be easily made by hand from plaster of Paris, wood, or metal moulds. The first step is to trace upon clay or plaster the design in outline or in low relief. From such a block any one, with a little experience, may construct a one-piece mould. Into this mould the clay is fixed and pressed until the design and shape are transferred. After drying, the clay may be fired at a temperature which need not exceed 2000° Fhr. The product will be a terra-cotta tile of comparatively little interest, as it will lack color and finish. These terra-cotta tiles, however, may be painted with under glazes and coated with over glazes so that a second firing will produce tiles of great value and permanence. It is hardly necessary to add that the design must be worth while; and

that the chemistry of the glazes must be such as to insure good results. It has long been the writer's dream that there should be some central office where designs of the highest quality could be produced and distributed to handicapped pottery workers in different sections of the country. Such a central office could afford to employ the best designers, and could distribute suggestions and advice and expert criticism which would insure adequate results.

The equipment of a small pottery is not expensive and is to-day easily obtainable. The kilns, which are the principal item of expense, may now be obtained in compact and practical form, the expense varying from \$100 to \$1,000, depending upon the size. If gas is used for heat, there is little or no objectionable smoke. The whole process may be carried on without prohibitive physical effort.

CHAPTER VIII

LIGHT BLACKSMITHING

Interesting work done without great outlay of physical strength. Expert knowledge of qualities of iron and its behavior gained from blacksmiths.

Material easily obtained in rods of any desired size.

Requisites,—forge fire, anvil and hammer.

Making of pokers and of boot scrapers described.

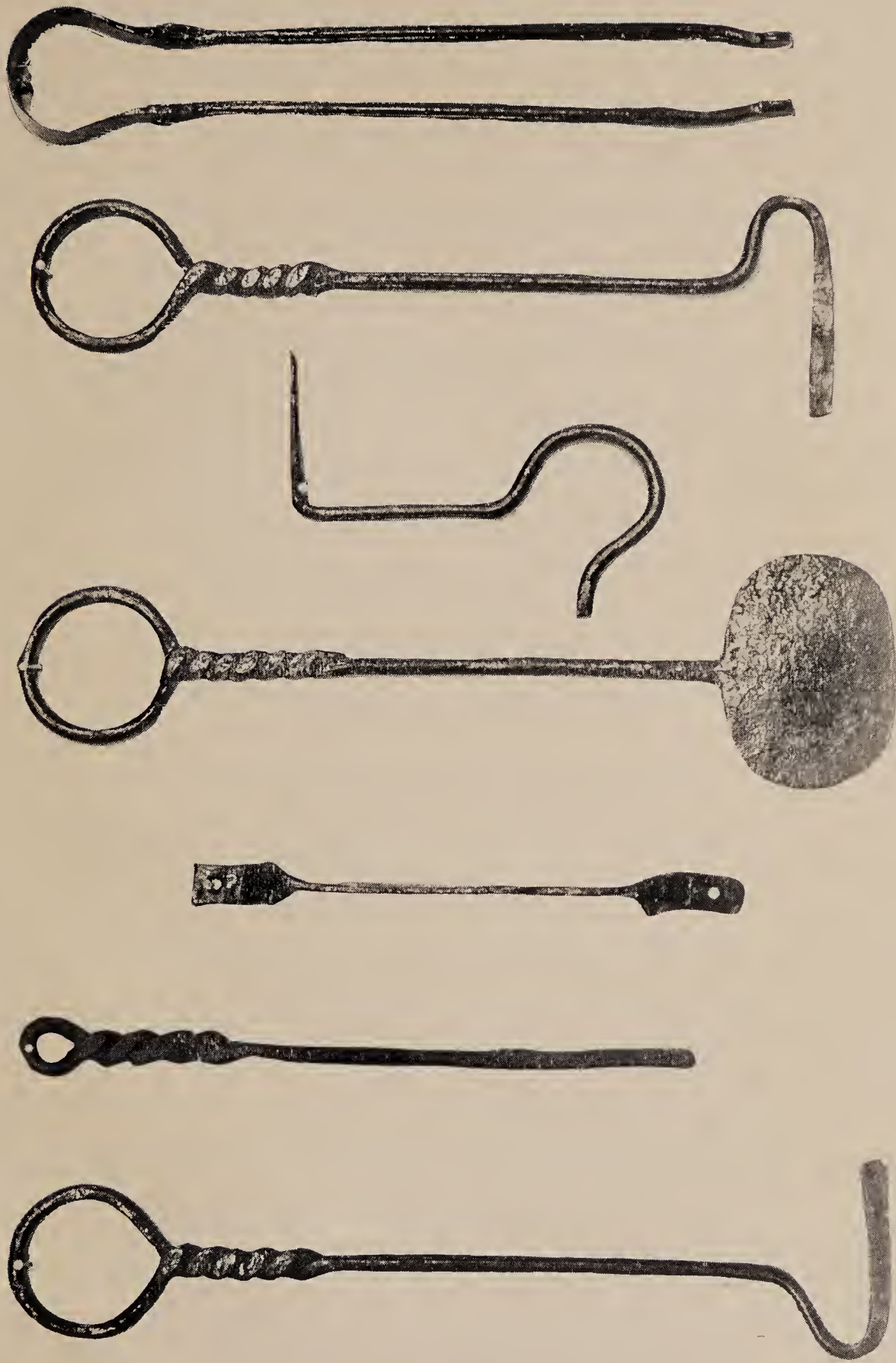
Illustrations of fireplace tools and of a foot scraper.

VIII

LIGHT BLACKSMITHING

AT first thought it seems absurd to suppose that an invalid might use with advantage so strenuous an occupation as blacksmithing. The term blacksmith covers a very wide range of work and does not necessarily mean horse-shoeing or making the heavy iron work for carriages. The reader will perhaps be surprised to learn that a great deal of very interesting and practical light iron work may be made with comparatively little expenditure of energy. In almost every village there is a blacksmith shop and a blacksmith skilled, to be sure, in heavy work but also thoroughly acquainted with the qualities of iron and its behavior in the fire and on the anvil. Such a man will probably have no conception of the artistic possibilities of light iron work, but his expert knowledge of the material may be utilized if we know how to go about it.

Iron comes from the mills in various shapes and it is always possible to obtain round rods of almost any thickness. A rod of soft iron three-eighths of an inch thick and four feet long may be made into a most interesting and practical poker for the fireplace with a little practice by any one with ordinary mechanical ability. The blacksmith's forge fire, an ordinary anvil and a light weight hammer are the requisites. Six or eight inches of the end of the rod are heated white and pounded into a ring or an oval handhold over the horn of the anvil. When this end of the poker is cooled, the other end of the rod is heated and turned over at a right angle. The end of the rod can then be hammered flat and pointed, all with the same hammer and with little difficulty. Such a poker is strong, large, and interesting from its very quality of being hand-made. It is, of course, quite possible to elaborate the design. But a fireplace implement made this way is desirable from its very simplicity. Those of us who have poked the fire with the short, skimpy pokers of commerce, know how to appreciate a long heavy poker which does not bring the face too close to the fire and



FIREPLACE TOOLS.
Made by an amateur after a few weeks' practice.

which is strong enough to use freely without bending.

In a similar way a long fire fork may be made and is a most useful adjunct to the group of fireplace tools. The shaft of such a fork should be at least four feet long with a looped handle at the top. The prongs are made by splitting the heated end of the rod with a cold chisel, and then rounding the prongs with a light hammer. A third or central prong may be welded in with a little experience.

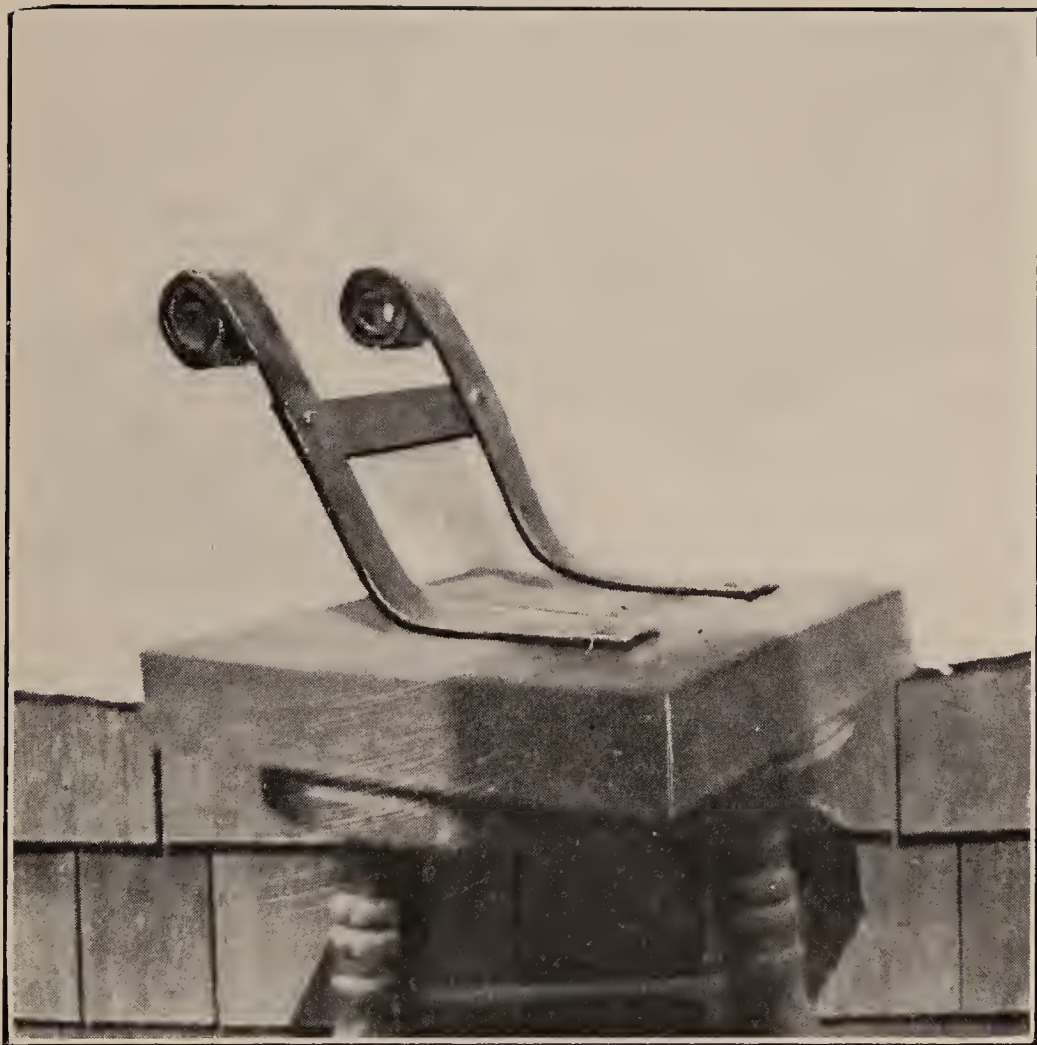
An excellent fireplace shovel may be made by turning up three sides of a square of sheet iron, riveting or welding on a long round handle.

There is no end to the useful objects which can be made of wrought iron. Fire dogs or andirons of a most useful and attractive sort may be made with a little practice. Great hinges and hasps for the doors of country houses, iron bars for fastening doors, and the staples to go with them, wrought iron nails with specially hammered heads, foot scrapers for doorways: these are some of the interesting and effective possibilities.

No attempt is made here to describe the ac-

tual technique of such work; the instruction which any good blacksmith can give will be worth more than the most elaborate description. The degree of heat to be used, the force of the blows, the knack of turning the iron—all of these must be learned by experience. The writer knows of no more fascinating work. There is something about the flying sparks and the unexpected softness and pliability of the hot iron that lend to such work a charm hard to describe. The accompanying photographs represent articles made after a few weeks' practice by an amateur blacksmith who had never before tried his hand at working in iron.

Often enough the village blacksmith forge and anvil are too much occupied to admit of teaching and experimenting. It is quite possible nowadays to buy of the manual training houses a portable forge which can be easily connected with the flue of the blacksmith's chimney. An extra anvil costs little and the necessary tools are not expensive. With practice the pupil should be able to turn out a line of fireplace iron which will command a good price. In the country village where there are summer visitors, these special local products



FOOT SCRAPER.

Made after a few weeks' experience at the anvil.

are sure to excite interest and a market. It is, of course, not so easy in the city to arrange for iron work, as the hammering is somewhat noisy and as the city blacksmith shops are usually too busy to bother with pupils.

IX

APPENDIX

BOOKS ON CRAFTS

GENERAL

Arts and Crafts in the Middle Ages	Julia de W. Addison.
Industrial Arts of Scandinavia in the Pagan Time	Hans Hildegrand.
The Origin of Gilds	C. Walford.
Two Thousand Years of Gild Life .	J. M. Lambert.
Revival of Handicraft in America .	West.
Early American Craftsmen	Walter Dyer.
Training of a Craftsman	Lane.
Principles and Practice of Decoration	R. G. Hatton.
Text Book in Domestic Art . . .	Carrie Crane Ingalls.
Art Applied to Industry	W. Burges.
The Art Crafts for Beginners . .	Frank G. Sanford.
Decorative Arts	William Morris.
Handicrafts in the Home	Mabel Tuke Priestman.
Home Life in Colonial Days . . .	Alice Morse Earle.
Arts and Crafts Movement	Oscar Lovell Triggs.
Design in Theory and Practice .	Ernest A. Bachelder.
Architecture, Industry and Art .	William Morris.
The Decorative Arts	William Morris.
Hopes and Fears in Art	William Morris.
Handwork Construction	Lina Eppendorff.
The Work of Our Hands	Hall & Buck.

BASKETRY

- The Basket Maker Luther H. Turner.
 Cane Basket Work Annie Firth.
 Aboriginal American Basketry Otis T. Mason.
 Practical and Artistic Basketry L. R. Tinsley.
 How to Make Baskets Mary White.
 More Baskets and How to Make
 Them Mary White.
 Indian and Other Baskets George Wharton James.
 Basket Designs of the Indians of
 Northwestern California A. L. Kracher.
 The Pine Needle Basket Book M. J. McAfee.
 Raffia Basketry as a Fine Art G. P. and M. P. Ashley.
 The Basketry Book Mary Miles Blanchard.
 Raffia Work A. H. Bowers.
 Basketry Book Ed. by Paul Hasluck.
 Raffia—Indian Basket Work Jacot.
 The Basketry of the Pomos, Tlingits, etc., issued by the
 American Museum of Natural History.
 Articles in the *Craftsman*, *The House Beautiful*, *School Arts*
 Magazine, etc.

NETTING

- How to Make Knots, Bends and
 Splices T. G. Biddle.
 Varied Occupations in String Work.
 (Macramé, Netting, etc.) Louise Walker.
 Knotting and Splicing Ed. by Paul Hasluck.
 Knots, Splices and Rope Walks A. H. Verrill.

WEAVING AND ALLIED CRAFTS

- Introduction to the Study of Tex-
 tile Designs Barker.
 Story of Textiles Walton.
 Household Textiles Charlotte Gibbs.

- Textiles W. H. Dooley.
 Textiles Woolman & McGowan.
 Hand-loom Weaving Luther Hooper.
 Warp and Woof (The Linen In-
 dustry) Edith Very
 Book of Hand Woven Coverlids . E. C. Hall.
 Practical Loom Fixing Albert Ainley.
 Ancient Egyptian and Greek
 Looms Bankfield Museum Notes.
 The Story of a Homespun Web . W. Godfrey Blount.
 Spinnerei und Weberei Georg Lindner.
 Haandbok i Vaeveing Halvorsen.
 Art, Ethics, and Economics in
 Handloom Weaving. Embroid-
 ery and Tapestry Weaving . . Macmillan.
 Tapestries—Their Origin, History
 and Renaissance George Leland Hunter.
 Book of the Bayeux Tapestry . . Hilaire Belloc.
 The Bayeux Tapestry F. R. Fowke.
 Samplers, and Tapestry Embroid-
 eries Marcus B. Huish.
 Indian Blankets and Their Makers George Wharton James.
 Navajo Weavers Washington Matthews.
 Art in Needlework Day and Buckle.
 Rugs, Oriental and Occidental . . Holt.
 Oriental Rugs Mumford.
 The Craft of Hand-made Rugs . Amy Mali Hicks.
 Philippine Mats. Manual of Mat Making issued by Philippine
 Island Bureau of Education.
 Encyclopedia of Needlework . . . Therese de Dillmont.
 Textile World.
 Master Weavers of the Desert Empire. *Harper* for July,
 1915, and other magazine articles in the *Craftsman*, *The*
 House Beautiful, *Art and Decoration*, *School Arts*, etc.

DYEING

- Principles of Dyeing G. S. Fraps.
 The Synthetic Dyestuffs Jocelyn Field Thorpe.
 Dyes and Dyeing Charles E. Pellew.
 Handicrafts in the Home. (Chap-
 ter on Dyeing) Mabel Tuke Priestman.

BOOK-BINDING

- Bookbinding and the Care of Books Douglas Cockerill.
 Bookbinding for Amateurs W. J. E. Crane.
 Elementary Bookbinding Mary Stiles.
 Practical Bookbinding P. Adam.
 Art of Bookbinding Zaehnsdorf.
 Directions for Mending and Re-
 pairing Books Stiles.
 Book-binding Ed. by Paul Hasluck.

CEMENT WORK

- Concrete Pottery and Garden Fur-
 niture Ralph C. Davison.
 (Munn & Co.)
 Concrete Stone Manufacture . . . Harvey Whipple.
 And articles in *Concrete-Cement*
Age, and *Industrial Arts Maga-* Concrete Cement Age
zine Pub. Co., Detroit, Mich.
 The Bruce Publishing
 Co., Milwaukee, Wis.

POTTERY MAKING

- Pottery Making J. R. Webb.
 How to Make Pottery Mary White.

METAL WORKING

- Treatises of Benvenuto Cellini . . .
 Iron Work J. S. Gardner.
 Silver Work Wilson.
 Elementary Metal Work . . . C. S. Leland.
 Art Crafting in Metal for Ama-
 teurs Chandler.
 Handwork in Wood and Metal . Hopper and Shirley.
 Copper Work Rose.

MISCELLANEOUS

- Toy Making—Cassell & Co.
 Toys and Toy-Making—G. H. Johnson.
 Making Fences, Walls and Hedges—W. H. Butterfield.
 Making Floors—Abbot McClure.
 Lantern Making—H. A. Rankin.
 Manual of Shoe Making—H. W. Dooly.
 Boot Making and Mending—Ed. by Paul Hasluck.
 Printing—Jacobi.

DEALERS IN CRAFT WORK SUPPLIES

- | | |
|---------------------------|------------------------------|
| Basketry—Reed and Raffia. | Milton Bradley Co., 73 Fifth |
| Chair Seating—Cane and | Ave., New York City. |
| Rush. | J. L. Hammet Co., Boston and |
| Netting—Hammock cords, | Cambridge. |
| needles, etc. | |

WEAVING

- | | |
|----------------------------|----------------------------|
| Looms, bobbin winders, and | Devereux Mansion, Marble- |
| shuttles. | head, Mass. |
| Rug Looms. | The Reed Mfg. Co., Spring- |
| | field, Ohio. |
| Homecraft Loom. | Mrs. W. Nott Shook, 41 W. |
| | 36th St., New York City. |

Reeds and Heddles.	Tinkler & Co., Philadelphia, Pa. John Huber Co., 511 West 29th St., New York City.
Mercerized thread, gold thread, and wool.	F. A. Straus & Co., 451 Fourth Ave., New York City. L. Littauer, 109 Greene St., New York City.
Warps.	Tinkler & Co., Philadelphia, Pa. (Chained Cotton Warps.) Elms & Sillon, 52 Chauncy St., Boston, Mass.
Rug material.	Milton Bradley Co., 73 Fifth Ave., New York City. (Spooled cotton warp. Cot- ton roving. Coarse spooled wool.) The Reed Mfg. Co., Spring- field, Ohio. (Spooled cot- ton rug warps.)
Dyed Yarns for hand weav- ing.	Devereux Mansion, Marble- head, Mass.
Dyes.	H. A. Metz & Co., 122 Hud- son St., New York City.
Book-binding Supplies.	De Jonge & Co., 73 Duane St., New York City.
Printers Supplies.	Damon & Sons, 44 Beekman St., New York City.

CEMENT SUPPLIES

Cement—Atlas Portland Cement (gray).

Cement—Atlas Portland Cement (white).

Sand—Any clean sharp crystal sand, medium size.

Cement colors.

Medusa Waterproofing.

Tools. Small trowel for smoothing and finishing, figure 6346— $\frac{3}{4}$.

30 Broad St., New York City.

Waldo Bros., Batterymarch St., Boston, Mass.

B. F. Drakenfeld & Co., 50 Murray St., New York City.

Cutter & Wood, Pearl St., Boston, Mass.

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